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THE USE OF FASCIAL STRIPS IN THE REPAIR OF RECURRENT INGUINAL HERNIA*

BY EDWARD M. HODGKINS, M.D.†

IN 1904, L. L. McArthur described his original method of using autoplastic tendon as suture material in the repair of inguinal hernia. Since that time, other surgical investigators have been attempting to develop some type of fascial suture technique which would be practical for all types of hernia. Such an ideal has not as yet been attained.

As inguinal hernia stands high numerically on the operative list, quite logically it received most of the attention in these investigations. As a result we now have methods available, particularly for recurrent inguinal hernia, that assure a much larger percentage of cures than ever before and I believe that certain of these methods deserve your serious consideration.

The repair of recurrent inguinal hernia is in reality a suture problem despite the preponderance of recommendations for changing the anatomy of the inguinal canal. Any well-planned operation will certainly prove successful if the sutures can be made to hold the muscle and aponeurosis unyieldingly in place. We find, in reviewing the literature on the general subject of hernia, that surgeons have always placed great confidence in the strength of fascia and yet there is a hesitancy about accepting it as suture material now. The present limited use of fascial suture technique is due, no doubt, to lack of information.

Most surgeons agree that muscle would have a very limited value surgically if it were not for the solid support of fascia. Is it not best, then, to regard muscle, used in hernia plastics, as merely a variable padding behind the fascia, which alone constitutes the real bulwark against recurrence. Muscle reinforced with fascial sutures and with fascia superimposed provides a strong and permanent structural combination.

Fascia is tough and fibrous and will withstand tension without tearing through structures; it is non-elastic and will not yield to intra-abdominal pressure from behind; it is readily adapted to cohere with other structures as scar forms; it is non-vascular and therefore will not atrophy or disintegrate. These physiological factors are familiar to all experienced surgeons and to enumerate them early in this paper may serve to emphasize the importance of fascia as recommended in later description.

At the present writing the problem among herniotomists is not how to take care of recurrent inguinal hernia so much as how to prevent it. This is, indeed, a most serious question when reports come to us from the best surgical clinics admitting recurrences anywhere from 2 to 10 per cent. Seelig and Chauke, in 1923, admonished the surgeons for attempting to sew the internal oblique muscle and conjoined tendon to the inguinal ligament, stating that the muscle would not grow to fascia and therefore this operation was entirely without scientific basis. Many surgeons agreed and were quite willing to give up this step or revise their operations if a better method of suture could be offered. Few, however, were willing to admit that some type of plastic operation was not necessary. More attention was then given to fascia alone as the proper material to be stitched into place and the time-honored muscle plastic threatened to become obsolete. Koontz, in 1926, not satisfied with the results of the Seelig and Chauke experiments, repeated them, producing entirely different results, thereby reëstablishing confidence in the muscle suture. To quote from Koontz's report:

> "The result (stitching the internal oblique muscle to the inguinal ligament) was firm union between the muscle and fascia. Microscopic sections confirmed the gross findings and showed the nature of the union. This was a union of the fibrous components of the muscle with the ligament. The muscle fibres were perfectly inert in the process, as would be expected, but there was a definite interlacing and growing together of connective tissue fibres from the ligament and of similar fibres from the epimysium, perimysium and endomysium of the muscle. It was, therefore, demonstrated that the union was in reality a fascia to fascia union, the union being between the smooth sheet of fascia forming the ligament and the fibrous components of the muscle".

Koontz attributed the successful union of muscle with fascia in these experiments to a thorough cleaning-off of all the areolar tissue covering the internal oblique muscle so that good fascia-to-fascia contact was made. All experimental investigators stress the importance of good fascia-to-fascia cohesion, which factor is indispensable in the cure of all herniae. From Koontz's experiments in particular, we may make the logical deduction that carelessness is in a certain measure responsible for a large per-

*Read before the Fall River Medical Society, February 12, 1930.

†Hodgkins—Assistant Professor of Surgery, Tufts College Medical School. For record and address of author see "This Week's Issue", page 833.

centage of the recurrences. Koontz's results have certainly been accepted by the majority of experienced surgeons and the suture of muscle to ligament in the repair of primary inguinal hernia will be retained; moreover, this step should in the future receive more careful attention. As yet, not having found the ideal in inguinal herniorrhaphy, it is certain that we will continue to have recurrences to deal with.

From a practical surgical standpoint, in operating for any sizable recurrent inguinal hernia, the space through which either the direct or indirect types emerge is a triangular one, bounded above by the lower border of the internal oblique and transversalis muscles, below by the inguinal ligament and the spine of the pubis, and mesially by the rectus muscle, including the fused rectus sheath. This space can be termed the surgical triangle. Successful cure depends entirely on a permanent closure of this triangle, which maneuver is not infrequently very difficult on account of wide dilation. Atrophy of the muscles from the effect of tension and constriction by sutures, as well as the greatly increased pressure during the formation of the recurrent sac, often results in a span that precludes the possibility of ever bringing these structures into close contact with each other. To repeat the former operation in the face of greater difficulties is illogical to say the least and a permanent cure from any such attempt can only be hoped for in a small percentage of cases. When a cure is obtained by repeating these ordinary methods it occurs by virtue of scar formation and not because the catgut sutures held the muscle in place.

With the intention of overcoming such difficulties, Gallie and LeMesurier, in 1921, introduced the method of "living sutures" of fascia lata to be used in place of catgut or non-absorbable suture material. These strips are cut approximately ¼" in width and threaded into special needles, with which they are woven back and forth between the edge of the internal oblique muscle and the inguinal ligament. Two or more are used until a firm continuous suture of fascia binds the muscle securely to the ligament. Of course an attempt is always made to approximate muscle and ligament as closely as possible. If, however, this cannot be accomplished without too great tension, the Gallie method has the added advantage of thoroughly covering over the intervening gap with a solid grid of interlacing fascia.

Koontz, in 1927, advocated the use of alcohol-preserved fascial strips from the ox. These are now provided commercially in hermetically sealed tubes. The technique of stitching them into place is essentially the same as that of Gallie. I have used both of these methods in a few trial cases and, after watching them carefully for several months, have come to the conclusion that they (Gallie and Koontz operations) are splendid and indispensable contributions to the problem of curing recurrent inguinal hernia.

I now agree with the conclusions of these authors; namely, that either type of fascia used as suture material becomes thoroughly healed into the tissues as a part of the whole structure and remains there permanently in the form of tendinous bands.

Recurrent inguinal hernia demands a suture method for closing this surgical triangle, which provides for a permanent approximation of the muscle with the ligament, or if this is not possible, which will bridge the intervening gap between muscle and ligament with new unyielding tissue. Before the introduction of fascial sutures we had been attempting to meet these requirements by doing operations such as the Halstead, Bloodgood, Andrews and other methods which depended on drawing rectus muscle, a plastic flap of fascia, or both, over from the rectus sheath to reinforce the suture line. This proved satisfactory for the cases in which approximation of the structures was easily done, i.e., in the undilated triangle, but in the more difficult cases where great tension of sutures could not be avoided, both muscle and fascia promptly returned to their normal position and not infrequently the hernia again recurred. Advocates of these methods were repeatedly warning us against the danger from too great tension on sutures.

Kirschner conceived the idea of bridging the defect with a free transplant of fascia lata and he claimed considerable success with the method. This is undeniably a logical procedure but one depending on a loose implant and not a secure suture. Kirschner's method is only applicable in a limited number of carefully selected cases.

In a paper published in *Surgery, Gynecology and Obstetrics*, December 1928, entitled "A New Method of Inguinal Herniorrhaphy with Living Fascial Sutures Obtained from the Rectus Sheath", I described an operation which is a "living suture method", having all the advantages of the Gallie technique without some of the disadvantages that have tended to make the latter unpopular. In this paper I proposed using the broad fascial sheath of the recti muscles from which to obtain the strips to be used as sutures, thereby avoiding the incision in the thigh, minimizing the chance of infection and shortening the time of operation. Up to that time my experience with the method consisted of only about 30 cases, all primary inguinal herniae except two. It was my deliberate intention to do this operation routinely in primary as well as recurrent cases so that a definite technique could be developed. I did not make any claim that the operation was at all necessary in primary hernia, but the results in the first series were very gratifying and I felt justified in publishing a preliminary report. Since that time I have accumulated a total of 75 cases altogether; 70 of these were primary and 5 recurrent. Results in the additional cases have been equally satisfactory, there having been no re-

currences to date and each patient has been examined at six month intervals.

When making the follow-up examination, particular attention is paid to the strength of the abdominal wall in the mid line over the denuded recti muscles, strength of the hernia repair under straining and coughing, size and condition of the external abdominal ring, and circulatory condition of the cord and testicle. The patient is then questioned about abdominal pain, testicular pain, or feeling of weakness in the inguinal region. Some of these cases are now two years old without complaint. An analysis of the cases would avail us nothing as they are all evidently strong repairs and feel entirely comfortable.

ANATOMY

Before describing the technique of using fascial strips obtained from the rectus sheath, it might be well to review briefly some of the regional anatomy bearing directly on this operation.

The anterior rectus sheath in approximately its upper three-fourths is composed of the aponeurosis of the external oblique muscle and one thin layer of the split aponeurosis of the internal oblique muscle, which are fused together. At the commencement of the lower fourth, the posterior wall of the sheath (formed by the aponeurosis of the transversalis muscle and one layer of the split aponeurosis of the internal oblique muscle) terminates in a thin curved margin, the semilunar fold of Douglas. At this point the aponeuroses of all three muscles pass in front of the rectus without any separation. The fascia thus composed is thicker and stronger than in any other part of the body. Compared with fascia lata, it is about three times as thick.

The fibres of the external oblique aponeurosis run obliquely from above downward, while those of the internal oblique and transversalis run almost transversely. Such an arrangement provides even greater tensile strength to a cut strip than if the fibres all ran parallel. We find a close example in the cloth industry where goods are cut on the bias, or obliquely to the weave, in order to increase tensile strength.

Strips of this fascia make ideal living sutures for use in the repair of recurrent inguinal hernia. By virtue of their fibrous character, these fascial sutures resist the strain of vomiting and coughing directly following operation better than do most other sutures. As the process of healing advances, an unyielding bridge is early established across the defect, while later a solid fibrous wall results.

Experimental work in this connection is interesting and also bears directly on the subject. Howes proved experimentally in dogs that catgut imbedded in the tissue lost all of its tensile strength well before the fourth day. Harvey, in recently published experiments on the velocity of the growth of fibroblasts in the healing wound, concluded that there is no appreciable growth before the fourth day and that from this period on, connective tissue is rapidly formed and by 10 to 14 days attains real tensile strength. Fascial sutures obtained from the rectus sheath are autoplastic pedicled grafts and do not lose tensile strength at any time during the healing process but become increasingly strengthened as fibroblastic invasion advances through direct continuity with the tissues in which they are imbedded.

TECHNIQUE OF OBTAINING FASCIAL STRIPS

The technique of the removal of fascial sutures from the rectus sheath is quite simple. Parallel oblique incisions approximately 5/16 of an inch apart are made through the sheath, beginning as high as possible at the lateral border of the opposite muscle and ending at the lateral border of the muscle on the side to be repaired. Although the fascia is loosely attached to the muscle and separates readily, light strokes of the knife will facilitate the maneuver. These oblique strips, cut from a high point where the muscles broaden out, are fully an inch longer than those cut transversely. As a general rule not more than three strips will be needed, even though the hernial triangle is large and the internal oblique muscle very much thinned out.

In the early cases done by this method, it was my custom to leave an intervening strip so that the recti muscles would not be denuded over a large area and thereby lose much of their fascial support. This was finally proved to be unnecessary as the general solidity of the fascial structure above, between, and lateral to the area of removal of the strips, served to hold the muscle adequately. The strips are now taken off side by side so that they are left attached near the medial leaf of the aponeurosis by a common pedicle. (Figure 1.) There remains one large surface of muscle denuded of sheath but not the slightest weakness results.

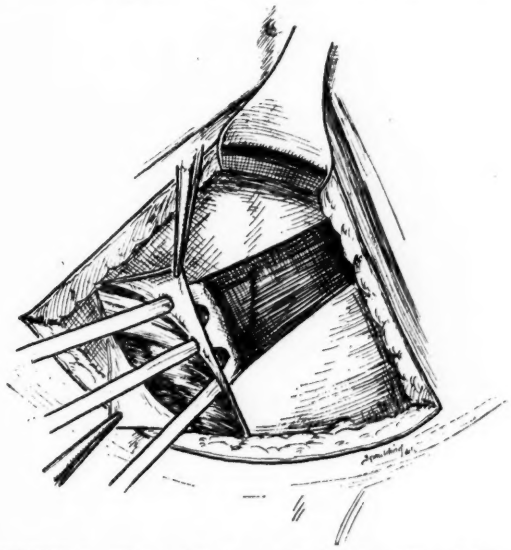

FIGURE 1. Three strips removed side by side and left attached by common pedicle at border of the muscle. Strips have been drawn through together at base of medial leaf of the external oblique aponeurosis for illustration only.

In removing many strips of fascia lata from the thigh and denuding a large area, it was found that the quadriceps muscle frequently herniated through the opening producing a bulging scar which was rather unsightly. The above technique described provides for utilizing fascia over a muscle which is without this disadvantage.

A fascial strip is prepared, threaded into a special needle with a large eye and tied into the eye of the needle with linen. Each strip is woven into the internal oblique muscle and inguinal ligament as a suture before another is cut.

TECHNIQUE OF WEAVING

The technique of weaving can be outlined in five definite steps.

First step. The fascial suture is drawn through the medial leaf of the external oblique aponeurosis, as close as possible to the line of surgical separation of the aponeurosis and the internal oblique muscle.

Second step. The edge of the internal oblique muscle is pierced from above downward and the suture is drawn through to the under side.

Third step. The strip is passed through the shelving portion of the inguinal ligament in the usual manner (from below upward) and is drawn taut.

Fourth step. The edge of the internal oblique muscle is again pierced from above downward and is picked up just above the first point of suture. The suture is again passed through the ligament and drawn taut.

Fifth step. Finally the needle is brought up through the fascial strip itself at most any convenient point along its course. The strip is drawn through and anchored securely at this point with a single tie of linen. You will note that the fourth step is in part a repetition of the third so that a two loop suture is effected. I have been using the latter in recent cases and feel that it is more satisfactory than the single loop.

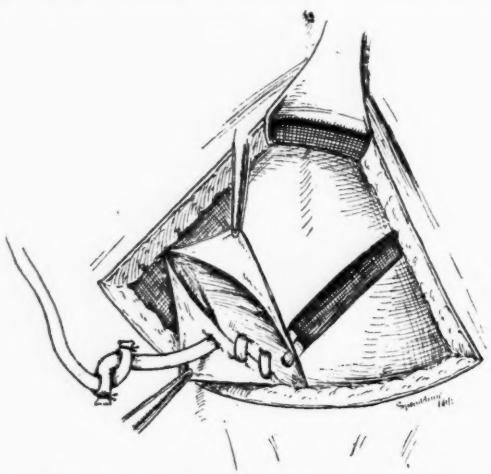

FIGURE 2. Two strips joined by Gallie technique. Muscle approximated to ligament by continuous suture. Lacing back and forth may be done as next step.

Variations in the hernial triangle may suggest other advantageous modifications to the operator; for example, one or two strips may be completely detached and joined together in series to the end of the original unattached strip (Gallie method). Figure 2. This produces a very long continuous suture with which almost any conceivable weaving can be done. Although such a maneuver is practical enough and unquestionably produces a sufficiently strong wall, the method of using single attached strips seems preferable.

Strength is further added to the repair by imbricating or overlapping the leaves of the aponeurosis of the external oblique. Figure 3.

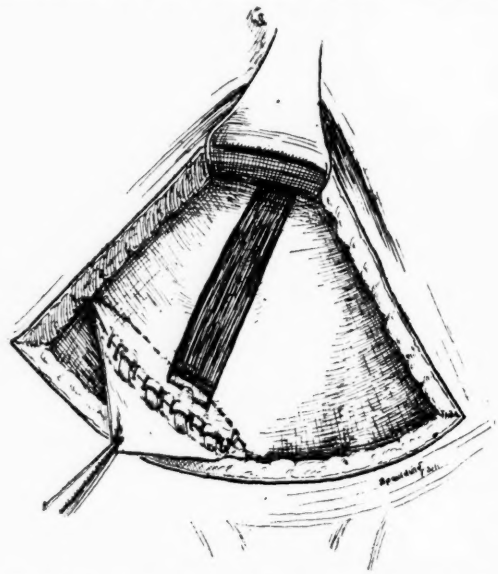

FIGURE 3. Fascial sutures in place. Medial leaf of aponeurosis sewed to inguinal ligament, lateral leaf to be overlapped and stitched into position indicated by dotted line.

Either interrupted or continuous sutures of chromic No. 2 catgut are used in this closure and provide a strong suture line. Various modifications of imbricating fascia are recommended in the text, most of which are reliable and require no detailed description here. Whenever possible I do the overlapping, but always with great care that there will be no pressure exerted on the cord. If there seems to be the slightest danger of this occurring, I prefer an ordinary anatomical closure with a continuous suture.

It is not my purpose in this paper to discuss choice of operation; however, for the sake of completeness it may be well to state that in a limited experience with the living suture methods I have found either the classical Bassini or the Ferguson operation to be suitable in meeting the requirements of any hernia as yet encountered.

The majority of authors are agreed that in primary hernia the choice of operation for the direct type is the Bassini and for the indirect, the Ferguson but few are agreed regarding what method is applicable to either type of recurrent hernia. I have taken the stand that together

with the type of hernia, the size of the hernial triangle should be considered in order to determine the operation best suited to the individual case.

For the indirect hernia with a small or moderately dilated triangle I prefer to sew muscle over the spermatic cord (Ferguson method). In the late cases of indirect the triangle is often very large and the neck of the sac literally takes in the entire peritoneal wall, such conditions demand the much firmer repair afforded by sewing muscle under the cord (Bassini method). In direct recurrent hernia I now employ the Bassini closure exclusively. Extra-aponeurotic transplantation of the cord with its attendant danger of disturbed circulation has a limited application, mostly confirmed to the cases in which there is a complete atrophy of muscle. I regard high amputation of the cord with complete closure of the inguinal canal a better procedure in these cases.

SAC

To enter into any discussion of inguinal hernia without some reference to the disposal of the sac would be considered incompleteness in the extreme. A brief description of this step will therefore conclude this paper. Whatever the method of suture and however carefully it may be done, proper treatment of the sac is of prime importance in the cure of all inguinal herniae. There is still a small group of clinical surgeons, notably Russell, who advise that proper treatment of the indirect sac alone is sufficient to effect a cure in this type. While we appreciate the importance of properly treating the sac, such an enthusiasm as Russell's is far from convincing and I am certain that the majority of us will still regard some type of plastic suture as indispensable in herniorrhaphy.

Most surgeons have been content for years with simply amputating the indirect sac as high as possible and allowing it to recede upward under the muscle. The direct sac has usually been opened and plicated with catgut or more often left entirely untreated. Admittedly, we all conscious of the illogical methods now recommended for treating the direct sac and I regret that I am unable to offer anything better.

In disposing of the indirect sac, I have preferred transplanting the stump and an original variation from the usual Kocher technique seems worthy of description. I can do no better than to quote as follows from my previous publication:

"The sac is opened and inspected, and drawn taut. Under direct vision a non-cutting needle carrying No. 2 chromic catgut is passed through transfixing the middle of the sac. This is tied on one side and then wrapped around and tied on the opposite side. The excess of sac above the tie is next amputated, and a few more stitches are whipped over the top of the cut stump. A more secure closure is thereby obtained and the liability of breaking and re-opening of the sac, as may happen in simple ligation, is eliminated. Both ends of the catgut suture should be left long and should never be tied together, as a knot over the face of the stump may prevent firm adhesion.

A finger is inserted up underneath the arching portion of the internal oblique muscle which is easily separated from peritoneum. With scissors a small aperture is made in the muscle by the careful separation of the fibres in the direction of their course. With a suture carrier or ordinary hemostat, the two ends of the catgut are grasped and drawn through the opening, and the stump of sac is pulled all the way through. Figure 4. Needles are now threaded

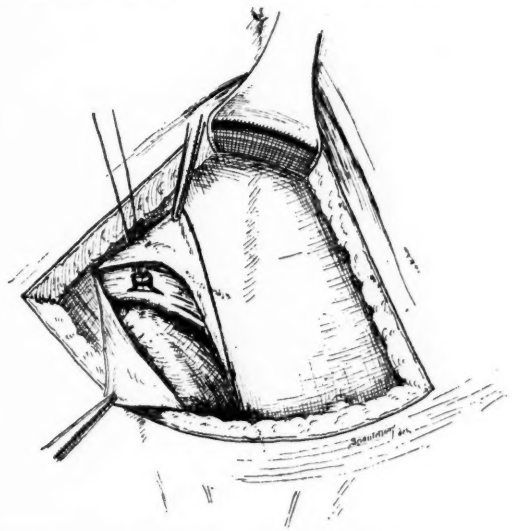

FIGURE 4. Stump of sac drawn through hole in internal oblique muscle so that neck is also well through. Catgut sutures through medial leaf of aponeurosis preparatory to tying outside.

onto the two ends of catgut, which are carried upward through the medial leaf of the external oblique aponeurosis 1.5 centimeters apart and tied above, the stump being drawn up tightly beneath this fascial layer.

The advantages of this method are mainly; the high dislocation of a weakened peritoneum away from the force of straining at the internal ring, sphincter action about the neck of the sac with each contraction of the internal oblique muscle and a firm point of anchorage beneath the aponeurosis of the external oblique muscle.

The proper suture material to be used in hernia operations is a subject which has attracted the intensive interest both of practical surgeons and laboratory workers. A dissatisfaction with past results is thus indicated and something worth while must ultimately be evolved. Whether or not we have arrived at a solution of the problem by the use of "living sutures" or animal grafts remains to be determined after many surgeons have tried these methods and reported their results.

In submitting to your notice these principles of fascial operating which I have proven to be

of some value, I may stimulate your further interest in this problem and thereby assist in hastening the solution.

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CONSTIPATION IN CHILDREN. A NOTE ON THE TREATMENT BY USE OF A RESIDUE-FREE DIET*

BY RICHARD M. SMITH, M.D.,† AND HENRY E. GALLUP, M.D.†

ONE of the common conditions which compels patients to consult a physician is chronic constipation. Every textbook on medicine contains a chapter or section upon the treatment of this disorder. It is confined to no one national group or social class. It is found among individuals of all ages. In adults it is perhaps more frequent in females, although by no means limited to that sex, but in children it occurs in both sexes with about equal frequency. Constipation is sometimes considered by physicians as a trivial or annoying complaint, the treatment of which consumes time which might be spent in the cure of other and more interesting diseases. By some internists, however, it is given an important place as the basis for many of the general symptoms of ill-health. To the pediatrist it presents a real problem, the solution of which is often difficult, and is deserving of serious study.

Constipation does not mean that a child fails occasionally to have a movement of the bowels or can accomplish an evacuation only by care in maintaining a regular habit and reasonable attention to the diet. It is a matter for concern when no movement occurs unless catharties are regularly employed, and frequent suppositories and enemata used. Many times even these measures are not sufficient to produce more than a scanty stool at irregular and infrequent intervals. Children who are, in fact, constipated, present also, in many instances, symptoms of greater or lesser importance. Abdominal pain is very often a prominent factor in these complaints. This pain occurs usually in attacks and is often severe and cramplike in character, simulating appendicitis. Operation with the removal of a normal appendix does not, however, give relief. Vomiting may accompany the attacks of pain or may occur quite independently of them. This vomiting is often stubborn and resistant to treatment, giving rise to a diagnosis of "acidosis" which, in fact, may ensue as a secondary condition. Fever is also present during attacks in many children and further serves to confuse the picture and divert the attention toward some other possible cause for the disturbance. Children who suffer from chronic constipation not infrequently fall into the group classified as having malnutrition. Their posture is faulty, with marked prominence of the abdomen and flabby abdominal muscles. They are easily fatigued. The parents of these children live in constant fear of an "attack", with all the attendant alarming (to them) symptoms. They have learned not infrequently that these attacks can be shortened by the prompt application of measures directed toward a thorough clearing of the gastro-intestinal tract. This usually means catharties, which are often vomited promptly, and repeated large enemata. If these measures are successful, the attack is cured—only to recur again at shorter or longer intervals. This story is familiar to anyone who has been in medical practice even for only a few years, and oppressingly common to those who have had a longer experience.

The physical examination of these children may reveal nothing of significance save the picture of a moderately poor general condition and faulty body mechanics. In many instances, however, the abdomen shows some distention and a feeling of indefinite resistance. Sometimes the colon may be palpated. Occasionally, indistinct masses may be made out, most often on the left side in the lower quadrant.

The conventional treatment is by prescribing a so-called anti-constipation diet, the essential principle of which is the taking of foods with high roughage and residue content. The most important element in this roughage is cellulose, usually as vegetables, and the husks of fruits and cereals. Combined with this diet, there is also prescribed some form of mineral oil, either alone or in combination with a laxative drug or with material which will retain fluid such as agar-agar. Directions as to fluid intake and a regular habit are also given. Enemata are recommended—usually large quantities of soap suds in water, sometimes with other substances added. This régime must be maintained for an

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indefinite period. In a considerable proportion of persons, this procedure results in overcoming the constipation, certainly in the milder and less prolonged cases. There are many children, however, who do not respond to this form of treatment. These are particularly the ones who have had the condition for a long time, and in whom the symptoms of pain and vomiting with faulty posture and malnutrition are pronounced. It is in this group that another method of treatment will produce better immediate results, and effect a more complete and permanent cure.

To understand the underlying physical condition which is responsible for this form of chronic constipation, it is necessary to bear in mind the physiology of the gastro-intestinal tract, particularly the lower bowel, with the normal function of the colon which produces evacuation.

The large intestine is supplied by nerves from the central nervous system. These run partly in the sympathetic system and partly in the pelvic visceral nerves, which come directly from the cord.

When food passes into the ascending colon, it fills the proximal portion of the large intestine. This distention causes a contraction to occur, which begins at the junction of the proximal and intermediary portion of the colon, or at the hepatic flexure. The contraction travels backward toward the caecum. These contractions are successive, and are spoken of as antiperistaltic. Regurgitation into the terminal ileum is prevented by the ileocolic sphincter. By this antiperistaltic action, which works against resistance, a portion of the semi-liquid mass slips back in the axis of the tube, thus producing a thorough churning of the contents. The increasing distention of the caecal region excites a true coördinated peristaltic wave, which, starting in the caecum, drives the food into the transverse colon. In the caecal region, as a result of the churning action, most of the liquid material and some nutrient material is absorbed. By means of occasional peristaltic waves, the drier residue is then passed on toward the splenic flexure and into the descending colon.

The descending colon is a place for the storage of feces and is the organ of defecation. The distinguishing feature of the distal colon, particularly its lower portion, the sigmoid and rectum, is its complete subordination to the spinal centers. It probably remains inactive until excited through the visceral pelvic nerves by the increasing distention, when evacuation of the contents occurs.

In man, the lower colon becomes filled from below upwards, the rectum remaining empty until just before defecation. If no response is made to the initial stimulus, the desire to defecate passes away because the rectum relaxes and the fecal mass no longer exercises pressure on its walls.

In some individuals with chronic constipation, the mechanics of the condition may be explained by a failure of the latter part of this emptying function just described to take place normally. As a result, the descending colon is over-distended with dry fecal material. This, in time, results in a loss of tone in the colon, so that distention becomes increasingly easy and evacuation correspondingly more difficult. This over-distention is facilitated by an anatomical condition, such as a redundant colon with ptosis, tending to favor the incomplete release of fecal contents. As this incomplete emptying continues, masses of dry fecal residue adhere to the inner surface of the colon, and thus still further interfere with its normal peristaltic contraction. Thus a vicious circle is established, in which each factor acts to make the condition more chronic.

Roentgen studies, by means of the barium enema, of the actual condition of the colon in some constipated children confirm the picture of disturbed or abnormal function, dependent upon a distorted anatomical structure. This is not to be confused with megacolon (Hirschsprung's disease), or other congenital abnormality. The condition is more clearly seen in the fluoroscope than in flat plates, because the functional disturbance is visible. As barium is introduced into the colon, it flows around, or by, masses of fecal material, remaining either as hard free masses in the colon or as dry residue adherent to the colon wall. The colon is redundant and distended, occupying a disproportionate amount of space in the abdominal cavity. Its surface is smooth, and the haustral markings of wider spacing. When evacuation takes place, the masses of fecal residue, especially those adherent to the wall of the colon, are left behind. Masses of barium are also seen in many places, and the size of the colon when contracted is larger than normal, the haustral markings coarser and less lace-like than in the normal colon. Contraction may also be less satisfactory than normal, and an atonic condition of portions of the colon be evident. From these findings, it is easy to understand why normal daily bowel movements do not occur.

The treatment of children with chronic constipation, due to this disturbed function of the colon, as shown by barium enema studies, is most effective if directed toward a restoration of a normal condition of the colon. This has been recognized by internists for a long time, but seems to have been neglected or given insufficient emphasis in dealing with children. A diet which has a large cellulose residue tends to make the condition worse, for it increases the bulk of material, which may be retained as hard masses or adherent to the mucous membrane of the colon. Provided normal function of the colon exists, this residue can be expelled, but if there is abnormal or subnormal function, evacuation is made more difficult. We endeavor,

then, in the first place, to reduce the fecal residue to a minimum, in order that the colon may be completely emptied. This is done by excluding all roughage from the diet. Vegetables, cereals, and fruit must be strained through a fine sieve. No coarse breads are allowed. In some individuals, milk should be restricted or excluded, because although it contains no cellulose, it may produce considerable residue. By means of this diet, very little bulk reaches the colon, and, therefore, no distention occurs from this cause. The stools become smaller in size.

The second procedure is to make whatever fecal residue is present of such a character that it will easily pass forward in the colon. This is accomplished by a liberal administration of mineral oil. This somewhat increases the bulk of the stool, but greatly facilitates its free movement within the colon. It is well known that mineral oil acts better if given in small doses after each meal, rather than in single large doses. Staining of the clothes is much less likely to occur, also, if the oil is administered in this manner. The actual dosage will vary, but in children, one-half to one teaspoonful three times a day is usually adequate.

The third factor of treatment is designed to assist the colon in evacuating whatever fecal residue is present. Some form of catharsis is usually necessary as a temporary measure. Our own practice is to give castor oil weekly, one-quarter to one-half ounce at bed-time. We realize that there is a considerable prejudice against the use of this drug, and we share the feeling that it has been used too freely in the past, but we believe that under certain circumstances it is of value. This condition is one of them.

It may be necessary, also, to employ enemata in the first few weeks of treatment. These should be used, however, with great caution, and given only in accordance with careful directions in order not to distend the colon. The patient should always be lying down, the enema bag should never be elevated more than eighteen inches above the buttocks, and not more than eight or ten ounces of liquid should be used. Plain soap-suds are employed. The enema should be given at a regular time, preferably in the evening. It is desirable for the patient to use a bed-pan after the enema; if this is not possible, he may be allowed to go to the toilet, but straining should be avoided.

Under this régime, improvement will begin in most cases within a few weeks. The enemata should be abandoned as soon as possible. The time between the doses of castor oil may be lengthened, and the drug discontinued as soon as regular satisfactory movements are established. The amount of mineral oil should be reduced as the next stage in the cure is accomplished. At this time, it is well to have another barium enema to determine the condition of the colon, and to ascertain whether there has been an improvement in its function. If such improvement has taken place, the diet may be modified by the gradual addition of substances having a higher residue-producing content. Usually fruit pulp is allowed first, and unstrained vegetables last. After a full diet has been in use for some weeks, another barium enema should be given and unless the colon is normal in appearance and evacuation takes place normally, care must be exercised in order to avoid a relapse to the former condition. With the cure of the constipation, the other symptoms of pain, vomiting, and easy fatigue disappear, and the children gain in weight.

Three illustrative case histories are given below.

CASE 1. G. C., two and a half years old, had been constipated since birth. Examination showed a prominent abdomen, palpable colon and fecal masses. Barium enema revealed a dilated, atonic colon filled with fecal matter. The patient was given a residue-free diet, mineral oil, weekly catharsis, and a daily enema. In six weeks the bowels were moving daily. At the end of two and a half months, she was having daily normal movements without oil, catharsis or enemata. Her diet was gradually made more liberal. There had been no return of constipation at the end of eight months and she was having a full diet. A barium enema showed still some fecal residue. The patient should be watched for a return of symptoms.

CASE 2. H. H., five years old, had been constipated since infancy, had patchy eczema, and was easily fatigued. Examination showed the abdomen large; no fecal masses were palpable. Barium enema showed a redundant colon, containing large masses of fecal material. The caecum was large and rather spastic. The patient was given a residue-free diet, with mineral oil, catharsis and enemata. Milk was restricted. The constipation was completely cured, the skin condition was improved, and the patient less fatigued. He returned to a full diet with no return of constipation. A barium enema showed the colon not distended and contracting well on evacuation.

CASE 3. A. B. W., seven and a half years old, had always been constipated. He began at three years of age to have attacks of "acidosis". Gain in weight was slow. Examination showed general abdominal resistance, especially in the right upper quadrant. Barium enema revealed a dilated colon filled with small masses of semi-impacted fecal material. The patient was given a residue-free diet, mineral oil, weekly catharsis and a daily enema. The attacks of acidosis disappeared in one month. Regular daily bowel movements had been secured by the end of two months. After eight months there was no return of acidosis, no more constipation, and no enemata or catharsis were required. He was taking mineral oil in small amounts and food which had passed through a coarse sieve. His general condition was excellent; he was gaining weight. Barium enema shows a normal colon and no residue.

BLADDER SYMPTOMS FROM DIVERTICULITIS OF THE SIGMOID*

BY FLETCHER H. COLBY, M.D.†

THE outstanding symptoms of diverticulitis of the sigmoid may so closely resemble those of a lesion primarily of the urinary tract that the correct diagnosis is obscured. Within recent years diverticulitis has been recognized as an important surgical problem, and numerous descriptions of the condition have appeared in medical literature. Little, however, has been written concerning the importance of the disease as a cause of bladder symptoms. It is from this aspect that I wish to discuss the subject.

Diverticulitis of the intestines is not of infrequent occurrence, and while it may involve any portion of the large or small bowel, the pathological changes are so often limited to the sigmoid that the term diverticulitis usually refers to this condition in that region.

The lesion probably arises by small herniations of the mucosa of the sigmoid through weakened places in the muscular layer associated with increased pressure within the bowel. The congenital diverticulum is less common and consists of a large sac with walls composed of all the intestinal layers. The fact that diverticula rarely occur in young persons would indicate that the common variety are not congenital, although there is doubtless a congenital predisposition. In the acquired form, the muscle layer becomes thinned out to complete obliteration, so that only an atrophied mucosa and peritoneal covering remain. The sacs may number from one to a hundred, or more, and vary from microscopic size to a diameter of one or two centimeters. Seldom do they attain any considerable dimensions. Gas within the bowel and an accumulation of intestinal contents within the sacs cause them to enlarge gradually. One to several inches of the sigmoid may be studded with diverticula, often stopping abruptly at the rectum, perhaps because of the stronger musculature in this structure. Due to the stagnation of fecal matter in the sacs, and the mechanical irritation of a mass rich in bacteria, inflammatory changes are prone to take place, favoring the formation of pus and abscesses. Associated with this process there is often present an inflammation of the surrounding tissues, a peri-diverticulitis. A marked increase in connective tissue results, and the formation of an appreciable tumor. Dense adhesions form, through which an abscess may burrow to adjacent organs, causing fistulae into layers of adherent bowel, or other neighboring structures. In a considerable number of cases, such fistulae occur between the bowel and the bladder.

The frequency of such fistulae is shown by the series of three hundred and twenty-four cases reported by Maxwell Telling and Gruner[9], in which there were thirty-eight instances of bladder fistulae, twenty-five of which were of certain, and thirteen of very probable, diverticular origin. The same authors mention another series of two hundred and eighty cases of diverticula in which there were thirty-three instances of adhesions between the bladder and the intestines.

Diverticulitis is usually a disease of adult life, found most frequently in well-conditioned, or even obese individuals who are, for the most part, beyond middle age. It is far more common in men than in women. The symptoms are characteristically varied, as is to be expected from the multiplicity of the lesions, being subacute or chronic, with exacerbations and remissions constituting a feature of the disease. The simple, uninflamed diverticular sacs cause no symptoms, but with the advent of inflammatory changes, symptoms arise. Vague abdominal uneasiness, increasing to actual pain in the lower quadrant of the abdomen, may be the patient's first complaint. Tenderness in this region, leucocytosis, and a moderate amount of fever have occasioned the diagnosis of left-sided appendicitis in a number of cases. A well-developed diverticulitis causes attacks of pain and tenderness over the entire colon, usually more marked in the left lower quadrant, but also frequently combined with distress in the right lower quadrant. The presence of a smooth, tender, sausage-shaped tumor mass in the region of the colon or sigmoid may be detected on palpation. The mass may disappear with a cessation of symptoms in the favorable event of the draining of an abscess into the lumen of the bowel, or the discharge of a fecal accumulation. Marked loss of weight or any degree of emaciation is not the rule even in the chronic cases. In fact, sufferers from diverticulitis are usually well nourished, except in those instances where peritonitis or other severe secondary changes are present. Periods of constipation may alternate with diarrhea or the passage of large quantities of gas. In the chronic cases a narrowing to occlusion of the bowel causes a persistent constipation, or total obstruction. When the inflammatory mass adheres to the bladder, there arises at first a vesical irritability with increased frequency of urination. Actual communication between the bowel and bladder results in the passage of gas and feces through the urethra, and causes marked cystitis accompanied by periodic attacks of frequent and painful urination. Pneumaturia is a characteristic sign of the establishment of a fistula, and occurs in but few other conditions,

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among which are the fermentation of urine containing sugar, cystitis caused by gas-forming bacteria, and malignant disease with erosion involving the bladder and intestines.

The intestinal symptoms which occur in diverticulitis with a vesico-sigmoidal fistula may easily be overshadowed by those of marked bladder inflammation. Bladder irritability is frequent and was a prominent symptom in 20% of diverticulitis cases reported by Judd from the Mayo Clinic. Vague abdominal distress may or may not have been previously present. Thus the history is often of little help in making the correct diagnosis. Careful cystoscopic examination sometimes reveals only the presence of severe generalized cystitis, a foul urine full of pus, and a bladder mucosa that is intensely inflamed without any definite sign of a fistulous opening. On the other hand, the mouth of the fistula may be observed in the mucosa with gas issuing from it into the bladder. Together with the cystitis there is frequently found a pyelitis of one or both kidneys. It is an easy mistake to consider the infection in the renal pelves as the underlying cause of the cystitis. But, of course, measures which ordinarily give relief in an infection limited to the urinary tract will fail to have any lasting effect on the chronicity of a cystitis due to a fistulous communication with the bowel.

X-ray studies of the gastro-intestinal tract are really the only way of establishing a diagnosis of diverticulitis. Both the opaque meal and the enema are necessary. In the symptomless diverticulosis, the pedunculated sacs filled with the opaque substance are sometimes found by accident in the course of a routine study of the gastro-intestinal tract, where some other pathological processes are present or suspected. The diverticula are best seen on the second or third day after the opaque meal. Because the communication between the bowel and the bladder may be very small, it is unlikely that there will be any x-ray evidence of such a fistula. Remnants of the barium are sometimes passed in the urine several hours after the enema, thus verifying the diagnosis.

The question of the presence of carcinoma is one which usually arises when one has to deal with diverticulitis, and a correct preoperative differentiation of the two conditions may be impossible. In twenty-seven cases of diverticulitis reported by Mayo[8], cancer was present in seven. The long duration of symptoms, together with the condition of the patient, is against malignant disease in these cases. Examination of the bowel with the sigmoidoscope and the x-ray, aids in making the diagnosis. Blood may be found in the stool in these cases, but its presence is more likely to mean carcinoma. Thus Judd observed blood in the stool in only 18% of the cases of benign diverticulitis, while in those associated with carcinoma it was found in 47%. When a vesico-sigmoidal fistula exists, cystoscopic examination is of great help in differentiating the simple inflammatory fistula from the irregular, infiltrated tract caused by cancer.

The treatment of diverticulitis and its associated lesions depends on the nature of the lesions encountered. Medical treatment, including careful supervision of the diet and habits of the individual, and large daily amount of paraffin, is sufficient in the cases of diverticulosis, and may keep the individual with diverticulitis free of symptoms. Surgical treatment is usually reserved for the severe cases. Persistent attacks of pain and tenderness in spite of careful medical prophylaxis, signs of threatened obstruction, a palpable tumor of the colon, frequent and painful urination, with attacks of pain in the lower abdomen and signs of an abscess or peritonitis, are definite indications for surgical treatment. The type of operation naturally varies with the nature and extent of the disease, no one operation being suitable for all varieties of changes in the bowel.

In the obstructing form of this condition, where peri-diverticulitis is present with a dense fibrous tumor mass, resection and anastomosis are necessary. Some cases lend themselves to simpler measures, but the difficulties which are encountered in undertaking a plastic operation on the diseased bowel may be insurmountable.

In order to give the diseased structures a complete rest, a preliminary colostomy or cecostomy should be performed. Colonic irrigations through the artificial opening aid in clearing out the affected sigmoid and diminish the inflammation. Cases of a rather mild degree of involvement not infrequently have been cured in this manner, a secondary closure of the stoma being made when the symptoms have ceased. After colostomy or cecostomy, the diseased portion of the sigmoid may be resected and an anastomosis made with some assurance of success. The colostomy may be closed when there is evidence that the anastomosed bowel has healed, such evidence being obtained by means of rectal irrigations or barium enemas. Where a fistulous communication with the bladder or other organ has existed, a repair and closure is made coincident with the resection and anastomosis. The preliminary colostomy serves the purpose of deflecting the fecal current from its ordinary channel and prevents infected material from coursing any longer through an existing fistulous tract. In patients with vesico-intestinal fistula the inflamed bladder is thus given an opportunity to heal and the cystitis rapidly disappears.

The following two cases are illustrations of diverticulitis of the sigmoid with bladder involvement, and bring out some of the points of the foregoing discussion. They are reported through the kindness of Dr. George Gilbert Smith.

CASE I. (L. D.) A leather salesman, 66 years old, complained of marked frequency of urination. Except for considerable indigestion in the past, and a rheumatic iritis, he had been well. Shortly before admission to the hospital he had had a severe gastro-intestinal upset with alternating periods of diarrhea and constipation. The acute symptoms had subsided, but he continued to have colicky pain above the pubes and voided every hour during the day and night. Emptying of the bladder was followed by pain.

Examination showed a patient in good physical condition with no evidence of loss of weight. A tender mass could be felt extending from the pubes almost to the umbilicus. The urine was clear and contained a few pus cells. Rectal examination showed the presence of a small, normal prostate and cystoscopic examination revealed a normal bladder with the exception of a reddened, oedematous area in the dome. Gastro-intestinal studies showed diverticula of the lower colon and upper sigmoid with considerable spasticity about this area. A diagnosis of pericystitis was made and the bladder exposed under local anaesthesia. Dissection between the bladder and peritoneum opened a pocket containing about an ounce of thick pus. The wound was closed with drainage. Convalescence was uneventful and the patient was discharged from the hospital fifteen days after operation. When seen about a month later he felt perfectly well and the suprapubic mass had entirely disappeared.

This case is a good illustration of bladder symptoms caused by diverticulitis of the sigmoid with abscess formation and adhesion of the inflammatory mass to the bladder. Here the pathological process was in an early stage and could be remedied by a simple operative procedure.

The second case illustrates a much more marked degree of bladder involvement.

CASE II. S. P., a leather worker 66 years of age, complained of frequent urination. He had been well until three years previously when he had "flu" followed immediately by bladder trouble. Frequent urination had persisted in spite of internal medication. On several occasions the patient had noticed the passage of gas by urethra and believed that his bowels emptied into his bladder. There had been no gastro-intestinal symptoms.

Examination showed a healthy appearing individual with no evidence of marked loss of weight. Abdominal examination revealed no abnormality but by rectum an area of thickening in the bowel could be felt which resembled inflammation rather than cancer. The urine contained brown fecal material. Cystoscopic examination showed an infected bladder with a small calculus on the base. No fistula was evident. Due to the suspected presence of a communication between the bowel and the bladder an abdominal operation was performed. Examination of the abdomen revealed a well marked diverticulitis of the sigmoid with a considerable degree of inflammatory thickening of the bowel wall. In dissecting the bowel from the bladder a fistulous communication between the two was opened. The bladder was opened, the calculus removed and the fistulous tract closed. The opening in the wall of the bowel was closed and a permanent colostomy performed. Convalescence was slow and it was necessary to close the suprapubic opening in the bladder. The patient was discharged ten weeks after operation with the colostomy working well and with no further bladder symptoms.

In this instance the inflammatory changes had been extensive and had involved so much of the bowel that resection and anastomosis seemed out of the question. Had there been the opportunity of following this case for a longer period of time such a procedure might have been considered if the bowel showed sufficient improvement as a result of the colostomy.

Both of these cases are examples of the insidiousness with which diverticulitis may develop. They further illustrate the fact that there may be little or nothing in the past history to suggest a lesion of the gastro-intestinal tract, the symptoms which bring the patient to medical attention being those due to secondary pathological changes. In the two instances cited these symptoms were of the urinary tract. In such cases the correct diagnosis may be reached only by means of a persistent search for the etiological factor of the cystitis, aided by a knowledge of the relationship between diverticulitis of the sigmoid and the pathological changes which involve the bladder.

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A PUMP TEST FOR FUNCTIONAL RESERVE OF THE HEART. A COMBINED CARDIODYNAMOMETER AND ACCESSORY BLOOD PRESSURE AIR TANK*

BY ALBERT S. HYMAN, M.D.†

THE need for a simple apparatus to determine the reserve power of the heart has been recognized for many years. In spite of the numerous elaborate cardiovascular examinations which may be made, the final test in any individual case, regardless of the lesion or lesions present, must be the capacity of that particular heart to perform physical exercise. From time to time various devices have been described, which extend from the simple stair-climbing test of Kraus to the more complicated tread-

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mill and bicycle machines used in various clinics both here and abroad. Of them all, the Wolffe cardiodynamometer and Felberbaum's portable steps are the most adaptable for routine clinic and office use.

In any cardiac clinic where many blood pressure examinations are being made, the examiner may find it irksome to keep inflating the arm cuff with the rubber bulb usually supplied with blood pressure apparatus. It occurred to me, a few years ago, that under such conditions a small tank of compressed air might be utilized for inflating the arm cuff. Connecting such an air tank with the rubber tube leading to the arm cuff of the blood pressure apparatus and controlling the inflow of air by a suitable stop-cock or valve would thus permit the operation of compressing the arm to be reduced to a very simple and rapid procedure.

Under such specifications an air tank and controlling valves were built for me by the Lehigh Manufacturing Company of New York. It was soon found that the procedure of blood pressure taking was rapidly expedited by this method and that it was especially well suited for the quick determination of blood pressure levels after the effort function test of cardiac reserve.

The compressed air was pumped into the tank by means of an ordinary automobile tire pump; each day before the clinic hour, one of the dispensary porters would pump the tank up to a suitable pressure. It readily became evident that this pumping procedure constituted in itself a very simple and easily performed effort function test and that instead of exercising a patient on the Wolffe machine, such a patient could do the same amount of work by pumping up the air tank. The pressure thus produced in the tank could be immediately utilized for inflating the arm cuff of the blood pressure apparatus.

A photograph of the equipment is shown in Figure 1; a brief description follows: (A) automobile tire pump, (B) rubber tube connecting pump with air pressure tank, (C) Schrader valve similar to that used on automobile tire inner tubes, (D) gauge to measure air pressure within tank, (E) air pressure tank, (F) rubber tube connecting air pressure tank to manometer of blood pressure apparatus, (G) shut-off valve to control the amount of air entering the arm cuff of blood pressure apparatus, (H) blood pressure manometer, (I) outlet valve to release air from arm cuff, (J) rubber tube connecting manometer to arm cuff, (K) arm cuff.

In determining the amount of work done in pumping the air from one pressure level to another the following formula can be used:

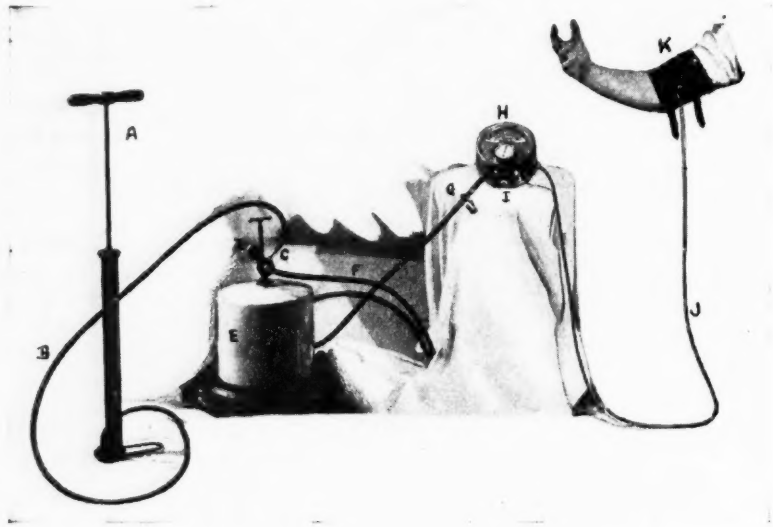

FIGURE 1. Pump and air pressure tank for the determination of cardiac reserve.

$$Ap \times Dp \times \frac{P' + P''}{2} \times Np = \text{Number of foot pounds of work performed}$$

where:

Ap = the surface area of the plunger of the pump
Dp = the distance over which the plunger travels
P′ = pressure in the tank in the beginning of the test
P″ = pressure in the tank at the end of the test
Np = number of strokes given to the plunger of the pump in performing the test

Knowing the surface area of the plunger and the distance over which the plunger moves, a factor can be obtained which is constant for any one apparatus. Furthermore, if a standard test of 50 strokes of the pump be used, an additional constant can be obtained. The determination of the amount of foot pounds of work performed can thus quickly be ascertained by multiplying this latter constant by the mean pressure developed within the tank.

For example, the surface area of the plunger of the pump used in the illustration measures 0.012 square feet; the length of the stroke is 1.33 feet. When 50 strokes are made the equation would thus read as follows:

$$0.012 \times 1.33 \times 50 \times 144 = 114.912$$

This latter figure may be considered as 115 and can be used as a constant factor. Thus, if the patient raised the pressure within the tank from 5 pounds to 35 pounds, the final equation would read:

$$115 \times \frac{5 + 35}{2} = 2300 \text{ foot pounds of work}$$

A conversion table is easily made for any pump or tank which is used. At the Cardiac Clinics of the Witkin Foundation the following table (Figure 2) has been found useful:

FIGURE 2

CONVERSION TABLE FOR DETERMINING THE NUMBER OF FOOT POUNDS OF WORK PERFORMED BY THE PUMP TEST USING 50 STROKES AS A STANDARD*

$\frac{P' + P''}{2}$	Foot pounds of work
5	575
6	690
7	805
8	920
9	1035
10	1150
11	1265
12	1380
13	1495
14	1610
15	1725
16	1840
17	1955
18	2070
19	2185
20	2300
21	2415
22	2530
23	2645
24	2760
25	2875

*If more or less than 50 strokes have been performed, the figure obtained in the table above may be computed by multiplying this latter figure by $\frac{50}{\text{number of strokes.}}$

At times, 50 strokes of the pump may prove to be too little or too much work for a patient to perform. Under such conditions the amount of work done may be calculated by its relation to the standard 50 stroke-test. Thus, if 10 strokes of the pump have been performed, the mean elevation of pressure would be divided by five, as one-fifth of the usual test had been performed.

The question is often asked whether the foot pounds of work performed by one method can be compared to the same number of foot pounds of work performed by another. From a theoretical point of view there should be no or little difference, but practically there may be considerable deviation when two sets of figures are obtained by dissimilar methods. For example, a patient may walk up a test flight of stairs and in so doing perform 2000 foot pounds of work within a given period of time. When the same patient performs 2000 foot pounds of work upon the Wolffe machine in the same period of time, an entirely different set of figures might be obtained. These differences which occur when the same individual does the same amount of work can only be explained by the effect upon the various muscle systems which are put into use. That test which utilizes the fewest muscles should prove to be less irksome to the patient than one which employs muscles not ordinarily used or combinations of muscles.

The stair-climbing test utilizes only the muscles of the lower extremities while the Wolffe test utilizes the muscles of the arms. The pump test described here involves not only the muscles of the arm and leg but also of the back and chest as the pumping procedure calls forth many sets of muscles. The work performed on a pump is thus more generally distributed throughout the muscle system than the other two tests. While these differences may be of little consequence in normal individuals, patients with heart disease respond very differently.

Tests were made upon 142 normal individuals of both sexes covering the age period from 7 to 61. The comparative results, so far as pulse rate response and blood pressure return to normal, were practically the same in both the Wolffe machine and the pump test.

On the other hand, with patients who have a disturbed cardiovascular system it was noted that a greater amount of work could be performed with the pump test than with the Wolffe machine before the same degree of dyspnea or pulse rate elevation was obtained. The significance of these facts requires further study.

The determination of myocardial reserve by any effort function test must be exclusively confined to children and young adults; it is strictly contraindicated in patients of middle and advanced years who are complaining of the anginal syndrome. To exercise such patients may be extremely hazardous as the patient may develop a stenocardial attack which might terminate fatally.

The very multiplicity of effort function tests, and the apparatus and equipment utilized, immediately suggest that no one test can be satisfactorily employed for all types of patients. The pump test described here is useful because it is simple; the apparatus is cheap. It employs no unusual maneuvers and except in the very obese, the work is easily performed. The secondary effect of compressing the air in a tank where it can be used for making the blood pressure examination more expeditiously will appeal to those who see the need of conducting the work of the cardiac clinic more efficiently.

CHORION CARCINOMA. A CASE REPORT

BY D. JOSEPH DUGGAN, M.D.*

THIS case is reported because of its rarity. Mrs. C. ——, aged thirty-nine, was admitted to the Melrose Hospital on March 22, 1928, because of a swelling of the right side of her vagina close to the vulva.

Family history negative.

Marital History. The husband and two children were living and well. Her husband had gonorrhea in 1927 while in the army, and an acute epididymitis in 1927.

Past History. The patient had had diphtheria, measles, and whooping-cough in childhood. Otherwise her past history was essentially negative.

The catamenia, which began at seventeen, had always been irregular; she would go six months without menstruating. Before the birth of her first child in 1921 (a low forceps delivery), the patient had three miscarriages, not induced. A second child was born normally in 1924. The menses thereafter were fairly regular and lasted from eight to nine days. They were always profuse but there were no pains or clots. Beginning June 4, 1927, the patient flowed constantly, with the passage of clots, until July 25, 1927, when she had an operation (D. & C.) at the Melrose Hospital. Menses came regularly from this time until the onset of her present illness and lasted from three to four days.

Present Illness. On March 11, 1928, the patient began to menstruate bright red blood. On March 16, 1928, while lifting her son, she felt something snap in her left lower abdomen. Shortly after she felt pressure in her pelvis on her right side. Her "stomach" (indicating the epigastrium) had a queer feeling as though something were jumping up and down. A swelling appeared on the right side of her vagina and persisted. The flowing of bright red blood continued. She stayed in bed until March 22, 1928, when she called her doctor. She was transferred immediately to the Melrose Hospital.

Physical Examination showed a well-developed but poorly nourished woman of thirty-nine years, conscious and rational, in poor general condition and suffering from shock from loss of blood. Pulse 116. Blood Pressure 98/72. Examination was not remarkable but for the local condition.

Local Examination. The abdomen was soft, lax and tender in both lower quadrants. No masses, hernia, or costo-vertebral tenderness were found. Pelvic examination showed a multiparous introitus and a poor perineal body. On the right vaginal wall close to the vulva, a rather friable, purplish swelling of clotted blood had eroded an area about the size of a quarter through the vaginal wall. The swelling extended up along the vaginal wall. Cervix not remarkable. A mass was felt in the left vault the size of an orange, not movable, irregular, and slightly tender. Right vault free. The uterus was slightly enlarged and retroverted.

Operation. Median suprapubic incision. Left tube found distended by what apparently was an extrauterine pregnancy which extended down through folds of the broad ligament and across between the bladder and uterus to the right side, passing thence down the right vaginal wall. The pelvis was cleaned out by the removal of both tubes and ovaries, with a supravaginal hysterectomy. The patient was returned to bed in fairly good condition.

Pathological Report. Specimen of uterus and tubes: The specimen consists of a moderate-sized uterus, tubes and ovary. One of the tubes is patent and without adhesions but the other tube, a few cm. from the uterine juncture, is dilated and ruptured and in the cavity is an irregularly rounded, white mass which measures about 2 cm. in diameter. It is adherent to the wall of the tube.

On microscopic examination of the uterus the mucous membrane is intact and a moderate number of stellate glands are apparent. The muscularis contains a moderate amount of fibrous tissue. In sections of the ovary a few corpora are apparent but the cells are without signs of active proliferation. In a portion of the tube containing the mass, the cells are composed of two types. Some are multinuclear, contain a granular protoplasm, and resemble syncytial cells; while the others are smaller, generally cuboidal in type, massed together in discrete areas, and are like cells of the layer of Langerhans. Both types are irregular in size and shape and frequently show nuclei in a state of mitosis. In some portions the tumor has degenerated and is infiltrated with leukocytes. Opinion: The Fallopian tube contains a chorion carcinoma. (Opinion confirmed by Dr. F. B. Mallory) Signed by Dr. Francis L. Burnett.

Subsequent course. The patient received x-ray and radium treatment at the Boston City Hospital under the direction of Dr. P. F. Butler. She was seen last on February 28, 1930. She had gained in weight and strength and her secondary anemia was much improved. Pelvic examination revealed no evidence of recurrence.

Comment. Tubal pregnancy has given rise to chorio-epithelioma in twenty-one reported cases, twelve by Risel[1], in 1915; seven by Leipmann[2], in 1914; one by Hartz[3], in 1916; and one by Garkisch[4].

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VERMONT STATE MEDICAL SOCIETY

THE TREATMENT OF CUTANEOUS BURNS*

BY FREDERIC W. BANCROFT, M.D.†

THE basis of this report is a series of 204 cases of burns treated at the Lincoln Hospital. Of these 90 were treated either by picric acid, electric cradle, various other types of local application, or debridement, and 114 were treated by the tannic acid method.

It seems particularly applicable to bring the treatment of burns before the general practitioner for two main reasons: 1—In our series studied, 34% of burns occurred in the first decade. The mortality at this age (45% in our series) is much higher than at any other age. It would seem that the general practitioner should institute preventive measures to cut down this tremendous incidence of burns in infants. The scars and deformities that have resulted from burns in childhood have frequently altered the entire life of the individual. 2—The first aid is generally instituted by the practitioner, and it is this first aid treatment that frequently spells either success or failure. Burns are usually described as being of three degrees: The first degree an erythema of the local skin: The second degree is usually considered as formation of vesicles containing serum; and the third degree wherein the surface epithelium is destroyed. From our studies of repair in burns it would seem advisable to describe a fourth degree, wherein the burn destroys not only the epithelium but deep into the connective tissue below the hair follicles.

According to the agents producing the injuries burns may be classified into (1) thermal, such as water, fire, etc.; (2) chemical, and (3) electrical. In general the treatment is the same in these three types. It has been shown that in chemical burns the washing with water to remove either the acid or alkali gives better results than the chemical antidote, such as an alkaline mixture for acid burns, and *vice versa*. Electrical burns frequently penetrate deep into the tissues, and the depth may not be recognized until the sloughs separate.

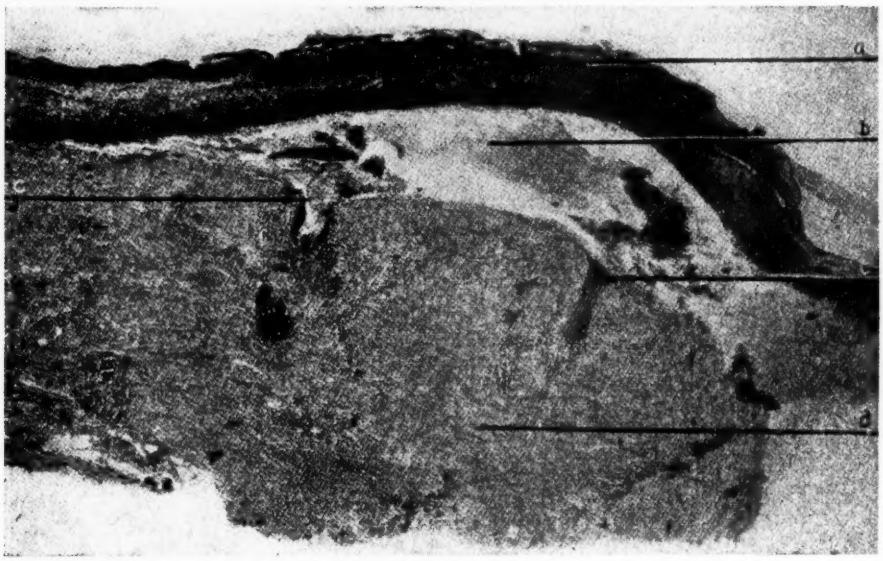

FIG. 1. Low powered view of the skin and subcutaneous tissue in a child, aged 8, who was treated by tannic acid. The sections were removed four days after the burn. *a* indicates the tannic acid membrane; *b*, the separation zone; *c*, the hair follicle, and *d*, the subcutaneous connective tissue. (From *Ann. Surg.*, July, 1926.)

LOCAL PATHOLOGY

Nelson's "Surgery" describes the local pathology of burns as follows:

"Pathologically the erythematous burns show little except dilatation of the capillaries with some fluid exudate into the tissues and occasional red blood-cells. There is no wandering cell infiltration of any extent. The restoration to normal is a matter of a short time, in which there may be some desquamation of the superficial layers. No permanent trace is left, although for a time there may be pigmentation in the area. This is due probably to pigment from the red blood-cells which has been engulfed by phagocytic cells in the immediate neighborhood and not immediately removed. In the blister the pathological picture corresponds with the clinical one as described; when the top

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of the blister is removed, a delicate pink epithelium is observed beneath. This is exceedingly thin, and in places there may be actual destruction of the tops of the papillae so that what appeared to be a second-degree burn was in reality a mild third.

"In burns of the second degree where the depth has not been sufficient to destroy all of the epithelium, healing takes place much as in an abrasion, with epithelization starting from many points over the surface, as well as from the edges. Frequently, if the original epithelium so that the slough, as it separates, is soft and moist. This separation of the slough differs in no wise from the separation of any slough. The intense inflammatory zone represents a line of demarcation." (Figs. 5-6-7.)

GENERAL PATHOLOGY

There is still some confusion in the minds of a great many, relative to the incidence of ulcers in the duodenum or in other parts of the intestinal tract, following cutaneous burns. In my review of the literature I have been able to find only one authenticated case of fresh duodenal ulcer found at autopsy. This case has recently been reported to me in a personal communication by Walter Estell Lee of Philadelphia.

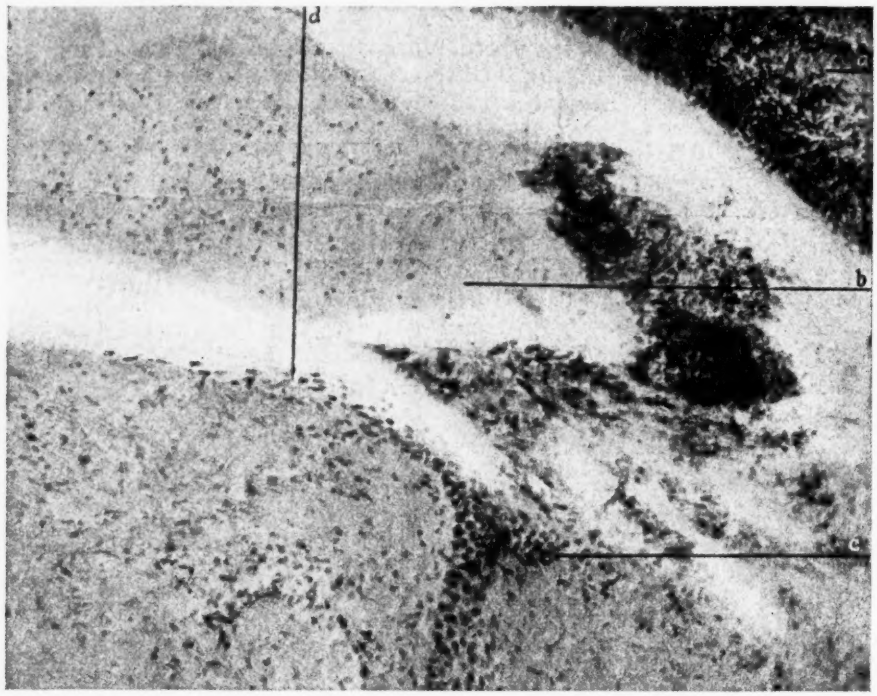


FIG. 2. High powered view of figure 1. *a* indicates the tanned membrane; *b*, the separation zone; *c*, the hair follicle; *d*, the beginning epithelization arising from the hair follicle, while the tannic acid is in situ.

which has been killed by heat is not removed, healing will take place under this burned crust as under a scab, and will proceed rapidly and under the most favorable conditions. In third-degree burns of any depth, however, the pathological picture is much more serious. Surrounding the area of necrotic skin and tissue beneath, there will be a zone of intense inflammatory reaction, fading out gradually into the relatively normal tissue of the uninjured portion. This is a zone of marked swelling, redness, heat, pain and tenderness. The dead tissue is often white at first; later as drying sets in, it becomes darker in color until it is finally seen as a black slough in the process of separation. These appearances are often altered by the fact that blisters may cover the surface of what really is a severe burn; furthermore, the superficial layers of the skin are often torn off during the removal of clothing or dressings, so that at first the surface may appear moist instead of dry. Also, depending on the type of treatment, the necrotic tissue may vary in moisture. Dressings may be applied

Bardeen and Weiskoten have made particular studies in quite a number of burn cases, dying within a few hours from their injury, and also in late cases, both in adults and children. The intestinal tract contained many punctate hemorrhages and occasional small ulcers in the jejunum and the ileum. Weiskoten emphasized the profound destruction and characteristic appearance of the adrenals. Three of our cases that died had marked distention suggestive of intestinal lesion, but unfortunately, due to the fact that they were coroner's cases, we were unable to perform autopsies.

Deaths from burns may be classified under two headings; first, shock; and, second, toxaemia. We have attributed cases dying within 48 hours as dying of shock, and those between 48 hours and 3 weeks as dying of toxaemia.

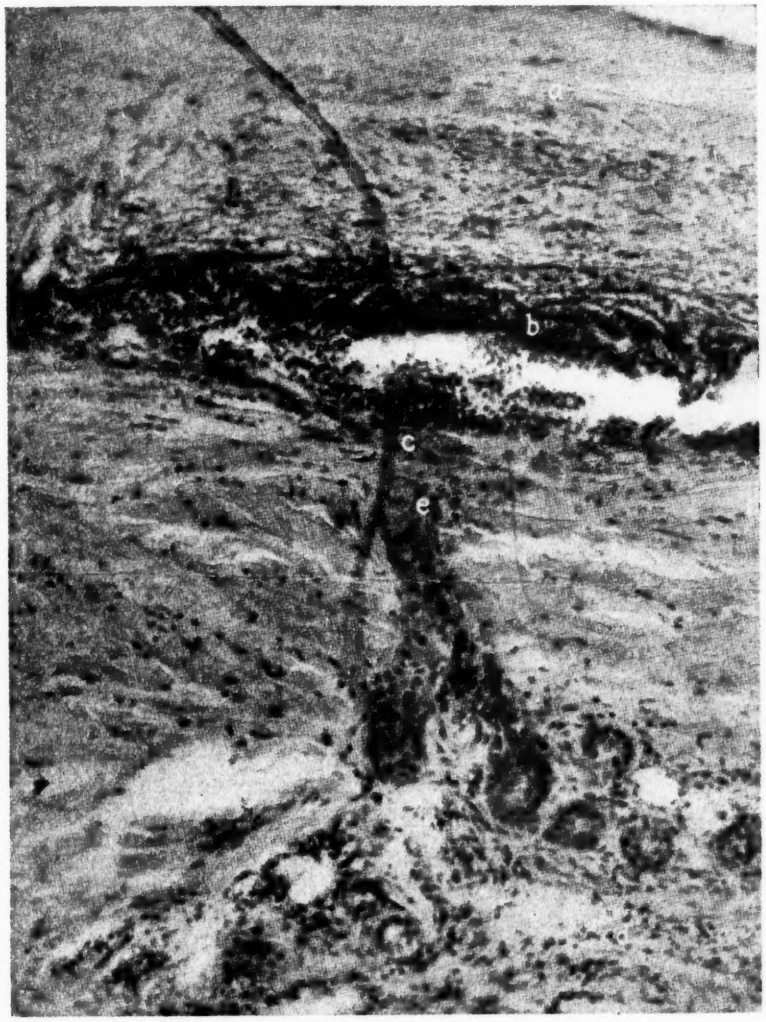


FIG. 3. Area of infection occurring beneath the tannic acid. *a* indicates the tanned membrane; *b*, the separation zone; *c*, the irregular zone of epithelium arising from the hair follicle; *e*, the infection proceeding downward along the hair follicle; *f*, the capillary filled with numerous polymorphonuclear leukocytes showing the gradual spread of infection.

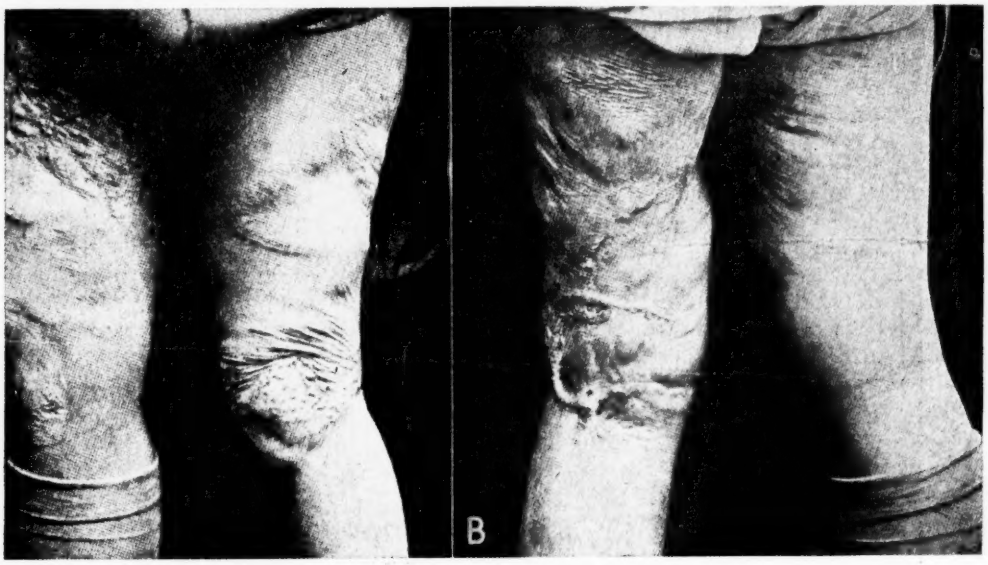


FIG. 4. *A* **is the anterior view of the patient in case 1, one year after leaving the hospital. It shows complete extension with no contractures, the result of numerous pinch grafts and the repeated manual extension of the knee joint.** *B* **is the posterior view of the same patient.**

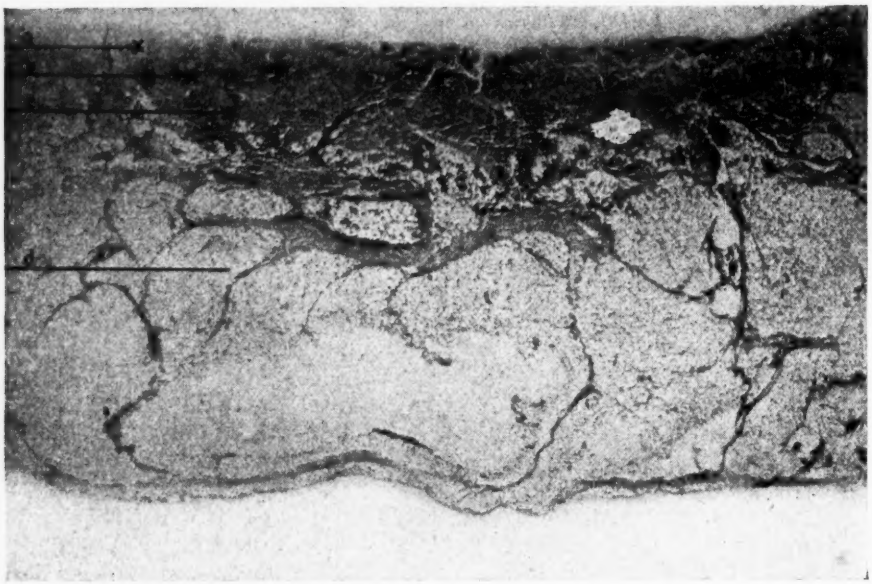


FIG. 5 (Case 1). Low powered view of the tissue debrided six days after the burn. *a* indicates necrotic tissue; *b*, the separation zone; *c*, the living connective tissue, and *d*, the fat. (From *Ann. Surg.*, July, 1926.)

In our series of cases at the Lincoln Hospital treated by tannic acid there was a total mortality of 20.1%. Of these 10% died of shock and 10.1 died of either toxaemia or infection. Deaths due to shock are presumably similar to those dying of shock from other types of trauma Numerous theories have been advanced to account for the deaths of patients dying from within three days to three weeks with symptoms suggesting toxaemia. Early writers thought this was due to interference with the skin functions and offered as examples the death of gilded experimental animals, but later evidence showed that these deaths were due to metallic poisoning. Robertson and Boyd burned the skin of young rabbits with hot metal plates. In one series of experiments the burned skin was removed within eight hours and grafted on unburned rabbits while the skin of the unburned rabbits was grafted in to fill the defect of the burned. Their result showed development of toxaemia in the rabbits receiving the burned transplants, while the others escaped. If the transplants were made after eight hours both

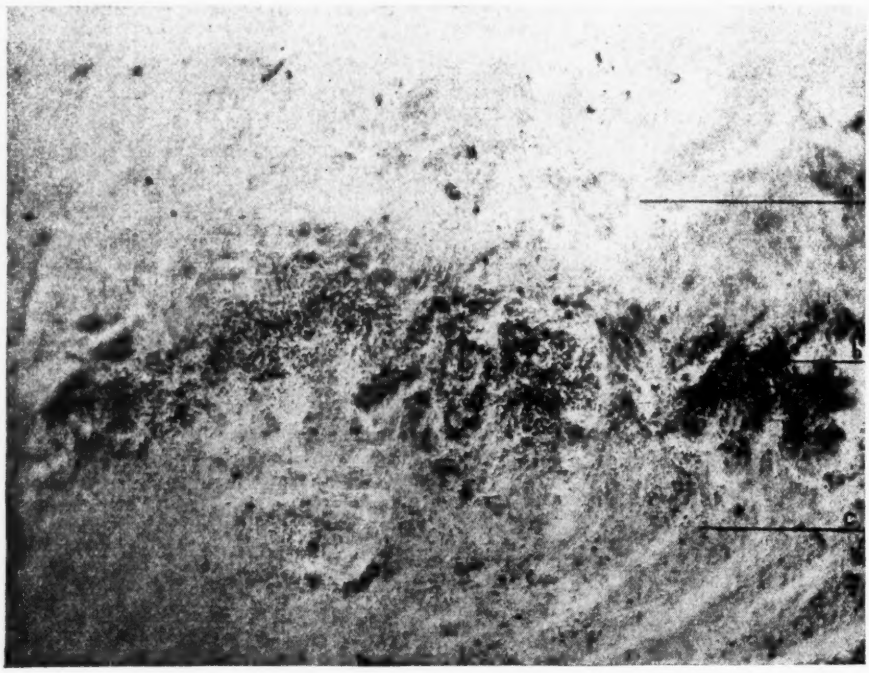


FIG. 6 (Case 1). High powered view of the separation zone; *a* indicates necrosed tissue on the surfaces; *b*, the separation zone; *c*, the connective tissue showing the presence of infection. (From *Ann. Surg.*, July, 1926.)

burned and unburned suffered. Robertson and Boyd further showed that the serum of burned children when injected into rabbits was in-

and neurotoxic; the other is thermolabile, colloidal and necrotonic. Chemically, the toxin consists of primary and secondary proteoses.

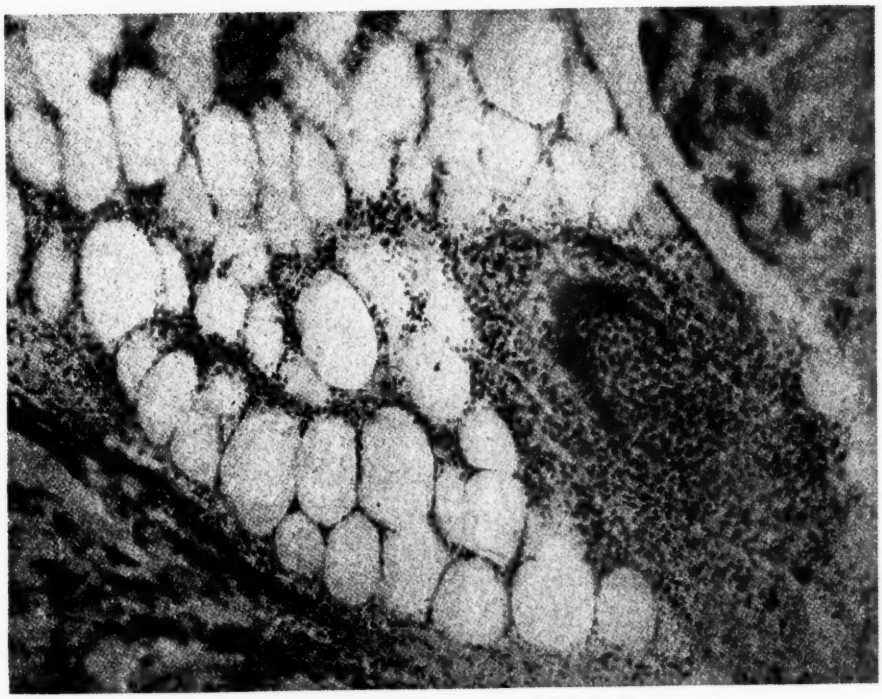


FIG. 7 (Case 1). Deep infection of fat and hair follicles. (From *Ann. Surg.*, July, 1926.)

FIG. 8 (Case 2). Patient four months after admission to the hospital. Note the emaciation of the patient with contractures of the knee joints, swelling and edema of the feet. Figures 10, 11, 12, 13 and 14 are microscopic views of the tissue beneath the granulating areas.

nocuous. The injection of citrated whole blood caused typical toxaemia. Their conclusions were as follows: Toxic substances consist of two portions—one of which is thermosable, diffusible

Underhill and his co-workers found a marked concentration of the blood in a study of 21 cases —the hemoglobin in the serious cases varied from 150 to 209 per cent. or normal. Underhill

concludes as follows: "Marked concentration of blood means a failing circulation, an inefficient oxygen carrier, oxygen starvation of the tissues, fall of temperature and finally suspension of vital activities." Similar conditions are found in war gases and in certain cases of influenza. He thinks that concentration is due to the constant pouring out of fluids on the burned surfaces. He believes an animal cannot long stand a concentration of 140% of normal value. When the blood has been concentrated the sodium chloride content of the blood

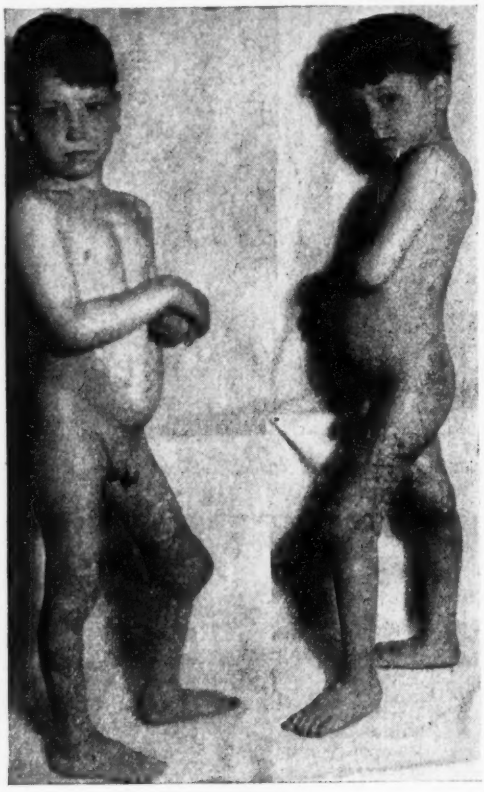


FIG. 9 (Case 2). Four years after admission. Note complete extension of both legs, all areas epithelialized, keloids on back from areas where pinch grafts had been removed.

is low. In other words, the sodium chloride content varies inversely as the haemoglobin.

Davidson, in a recent paper read before the Surgical Section of the New York Academy of Medicine, reported similar findings of sodium chloride depletion and suggested the analogy between the toxaemia of intestinal obstruction and burns. He says: "A third group of twelve patients was investigated in which the burned area varied in extent from one thousand square centimeters to 24 per cent. of the total body surface. In these cases the blood chlorides remained at a very low level as long as sloughs were present. Upon separation of the devitalized tissue, when absorption was no longer taking place, the blood chlorides rose, and a parallel rise of the urinary chlorides was noted. The depressed values of the blood chlorides could not be attributed to diet, blood concentration, altered renal threshold, fever, nor to loss of plasma from the burned surfaces. The evidence suggested that there was retention of sodium chloride in the tissues in general quite similar to those observed in pneumonia.

"In view of these findings it would seem rational to correct this metabolic deficiency by the administration of sodium chloride. Further studies are necessary to determine whether sodium chloride will spare body protein similar to that observed by Haden and Orr in intestinal obstruction."

TREATMENT

Treatment of burns depends upon the depth of the burn, the area involved and the age of the individual. Treatment may be classified into treatment of the local condition and treatment of the toxaemia. The first degree of erythematous burns may be treated in almost any manner. Wet dressings of any type that relieve the immediate pain are bound to succeed. Wet dressings of sodium bicarbonate, tannic acid or picric acid are all efficacious. Many types of ointment will help to relieve the initial pain.

For burns of the second-degree type of small area, where often one finds one or two blisters—particularly on the hand—and it is evident the burn is of a very superficial type, the puncture of the blisters by a sterile needle introduced at the side, and then a compression bandage which is not to be disturbed for three or four days, has often allowed the epidermis of the blisters to become again vascularized, with a complete and quick cure.

For extensive burns of the third degree the tannic acid treatment has proven by far the best method in my hands. Davidson has propounded the theory that tannic acid coagulates protein and precipitates the poisonous materials in burned tissue—thereby preventing their absorption. On arrival at the hospital the patient should be treated for immediate shock. Morphine should be given, and either a hypodermoclysis or a transfusion as soon as possible. If the patient's condition warrants, he should be taken to the operating table and anaesthetized, and the skin about the burn thoroughly washed with soap and water, ether and alcohol. The burned area should also be cleansed in a similar manner, and the epidermis covering all blisters should be thoroughly removed. If the patient is in too great a shock to stand an anaesthetic, the skin about the burn should be thoroughly cleansed, all blisters removed, and the burn cleaned as much as can be done considering the patient's general condition, and dressings saturated with a 5 per cent. aqueous solution of tannic acid applied. These dressings are applied loosely and kept saturated with the solution for 24 hours or until the burned area is tanned a mahogany brown. Other authorities have advised using a spray of tannic acid, without the application of dressings. We have preferred the loose application of gauze saturated

with tannic acid. No bandages or constricting apparatus are applied. When the burned area is sufficiently tanned, all dressings are removed and a tent is made to prevent pressure of the bed-clothes. Warm air is created by inserting electric lights. Care should be taken to keep sterile pads or sheets beneath the burned areas that rest on the bed. Infection can, and frequently does, occur beneath the tanned area (Fig. 3). Every effort should be made to prevent its inception.

We have found that patients with burns need constant care, and badly-burned patients should have a special nurse. The burnt areas must be kept scrupulously clean, and the patient's position must be constantly changed. Forcing the fluids is important, as it diminishes the toxaemia and aids the kidneys.

INFECTION BENEATH THE TANNED MEMBRANE

In a typical case of first or second degree burn, after a period of one to two weeks the tanned membrane begins to curl at the edges, and it is seen that epithelialization has already been initiated. If infection is not present, the membrane gradually separates, leaving beneath it newly formed epithelium and granulating areas of relatively small extent, dotted here and there with islands of epithelium. (Figs. 1-2.)

In the third degree type of burns, the membrane is lifted by the serum after a while and has to be removed. Treatment of the granulating surface then presents the same problem as in any third degree burn with any type of treatment. There are a certain number of patients who have an elevation of temperature from 102 to 103 F., which continues for a week or ten days; eventually they succumb if the infection is not treated. The pulse is not extremely rapid but of low tension. They do not seem seriously ill. They often suffer from gastro-intestinal disturbances, such as vomiting and diarrhoeas. Clinically these cases resemble neither a staphylococcus nor a streptococcus type of infection, but they somewhat resemble a subacute type of gas bacillus infection. During our early experience with burns, a few of these patients died because we did not recognize the necessity of treat-

FIG. 10. Low powered view of the tissues removed by debridement in case 2. *a* indicates the superficial granulating area (fig. 11); *b*, the junction of the granulating area with the scar tissue (figs. 11 and 12); *d*, the deep fat with infiltration of leukocytes and round cells about the vessel (fig. 14) and *e*, infiltration of fat extending down as far as the fascia lata with large cells retaining one or more nuclei (fig. 14).

ing the infection beneath the tanned membrane. On studying sections taken from this membrane, we found infiltration of the fat and subcuticular layers with polymorphonuclear leukocytes (Fig. 3). After this experience we decided to treat the patients for the infection and not for the burns. At present, when a patient has a high temperature and there is redness about the periphery and tenderness beneath the membrane, it is our custom to anaesthetize him and excise the membrane as far as possible. Wet dressings are then applied to the granulating area. At first hot boric acid dressings were used. We found that crusts continued to form and that the granulations became infected and exuberant. The epithelialization was much delayed.

Bennett, Blackfoot and Browning advised treating these patients with a 1/5000 acriflavine. We adopted this method and have felt it to be of great value. The dressings are loosely applied and kept saturated with the solution. The granulations beneath it are red and clean, and epithelization occurs rapidly. We have been unable to detect any evidence of toxic absorption from the solution.

Islands of epithelium arising from the hair follicles and spreading over the granulating surface begin while the tannic acid membrane is separating but before it is completely removed. If infection can be prevented or diminished, this epithelialization occurs so rapidly that the necessity for skin-grafting has been greatly diminished.

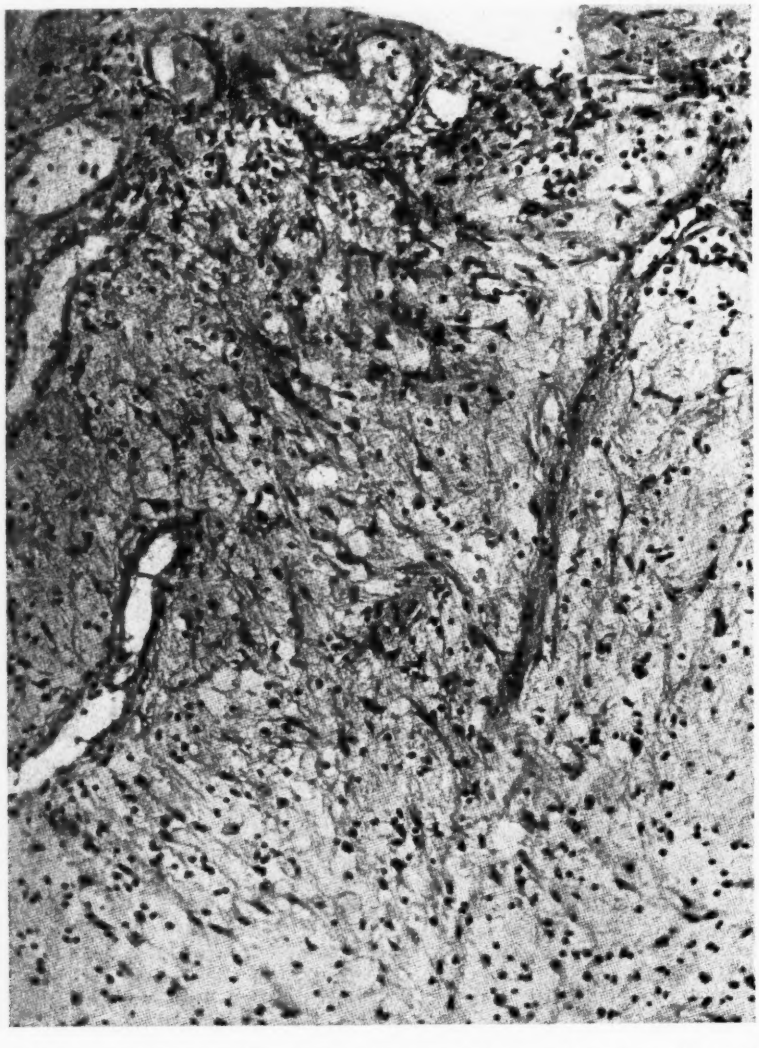


FIG. 11 (Case 2). High powered view showing edema of the superficial granulating area with slight degree of infection. Numerous blood vessels can be seen. *a* indicates the surface.

Treatment of Toxaemia

In the treatment of toxaemia there are three main conditions toward which one's efforts must be directed, viz.:

(1) Sodium Chloride depletion;
(2) Secondary anemia; and
(3) The absorption of toxic products from the granulating surfaces.

(1) Davidson and others have shown that there is a marked sodium chloride depletion.

We believe that if possible the blood chlorides should be examined every third or fourth day. As a routine practice it is advisable if a patient shows evidence of vomiting, to give 2000 to 3000 c.c. of saline a day. With marked vomiting, 500 to 1000 c.c. of 2% saline solution subcutaneously or 500 c.c. of 3% saline given very slowly intravenously will often completely stop the nausea and vomiting, and bring the chlorides to normal. We believe that one cannot too strongly emphasize the necessity for the injection of saline in these toxic cases.

The necessity of fluid intake is shown in one of our cases. A woman, 32 years of age, was admitted April 1, 1926. Her clothes caught fire while reading in candle-light and she had extensive second and third degree burns of abdomen, chest, buttocks and thighs. She was treated by tannic acid for 24 hours. Two days after admission she was vomiting persistently. On the second day she was given 3000 c.c. by hypodermoclysis and on the third 2000 c.c. After the first hypodermoclysis her vomiting ceased. Four days later she again started vomiting but was immediately relieved by hypodermoclysis.

(2) Very frequently a gradual anemia develops which escapes the attention of the surgeon. Where there are extensive granulating surfaces a secondary anemia is almost bound to occur. Transfusions in these cases are extremely advisable. One often has to transfuse a badly-burned case at intervals of once a week for several weeks. Frequently one is astounded after transfusions to observe the improvement in the ingrowth of epithelium over the granulating areas.

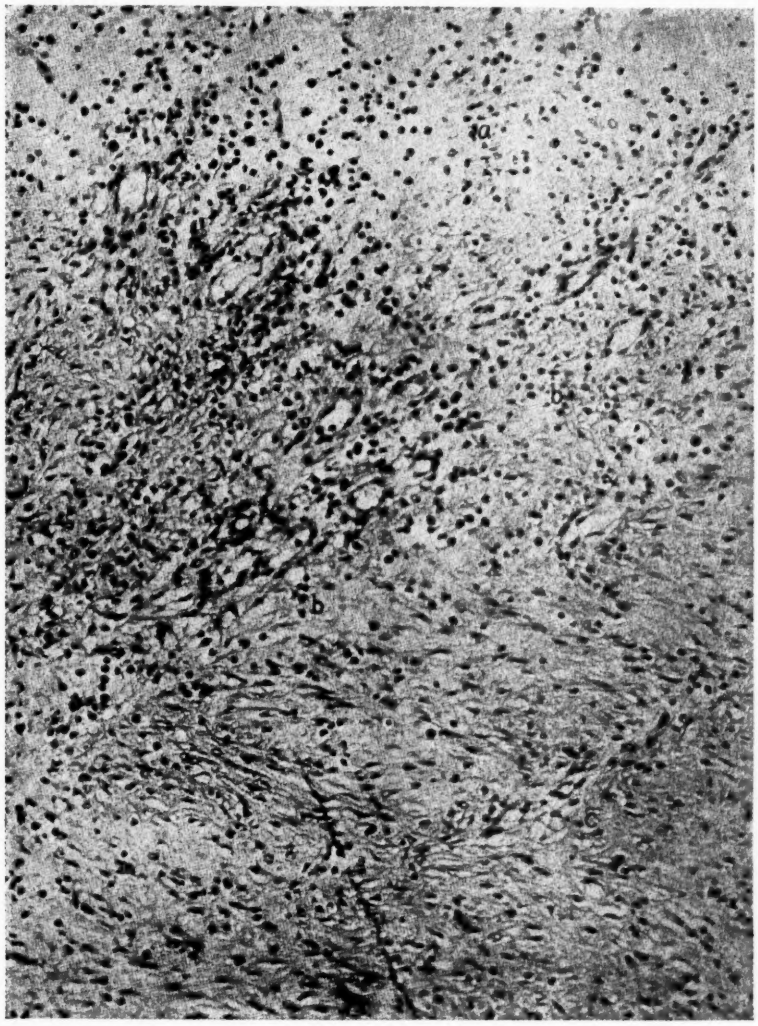


FIG. 12 (Case 2). High powered view of the junction of granulation and scar tissue. *a* indicates the superficial granulation tissue; *b*, the junction of the scar and granulation tissue; *c*, the scar tissue. It is obvious that if a curet were used in this case the granulation would be removed to (*b*), leaving a dense scar tissue base.

Ex-sanguine transfusion has been advocated but it seems to us a very heroic procedure. Accidents might happen during the transfusion necessitating its discontinuance. Furthermore, it can only be of very transient benefit as toxins are being constantly poured into the blood stream.

(3) If possible it is advisable, as soon as the tannic acid membrane sloughs and separates and it is evident that there are not islands of epi-

thelium on the granulating surfaces, to skin-graft almost immediately. Skin-grafting reduces the absorption of toxin and prevents the secondary anemia. Therefore it is a valuable method to control toxaemia.

SKIN-GRAFTING

In areas in which infection of the granulating surfaces has persisted for a considerable time, many failures in grafting the skin occur.

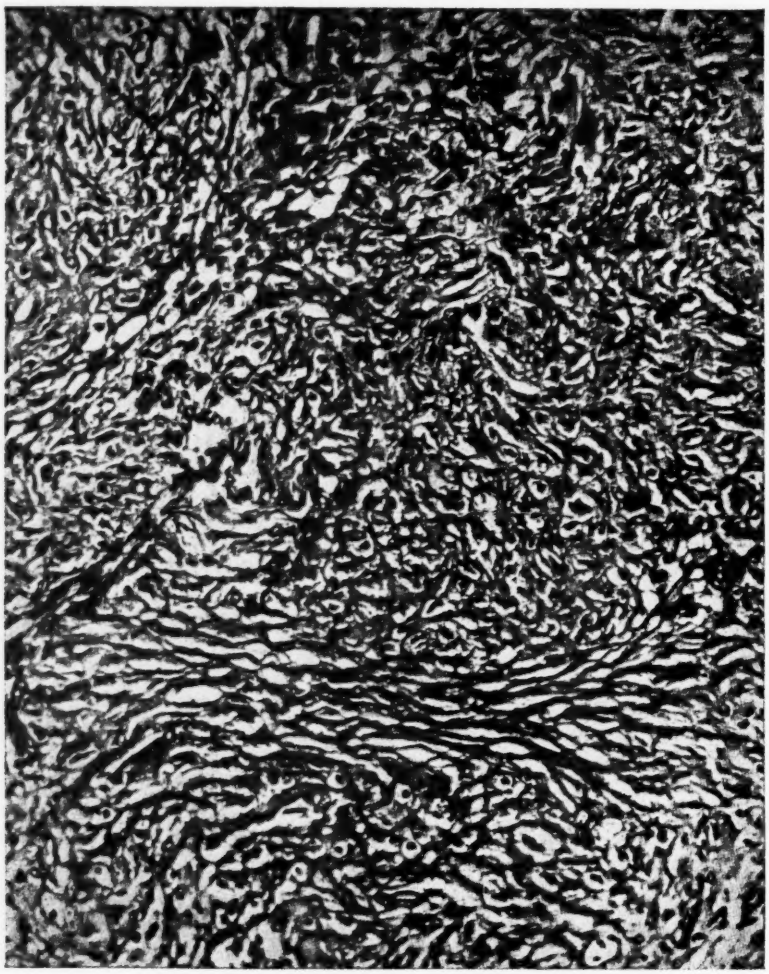


FIG. 13 (Case 2). Dense scar tissue in the region of the deeper area.

One may assume that so-called exuberant granulating tissue is due to a low-grade infection. If this persists, scar tissue forms beneath the superficial granulations. As the scar tissue contracts, the circulation is greatly interfered with, so that unless the entire scar tissue area is removed, skin-grafts will not derive sufficient blood supply to persist. If a curet is applied to this area, granulations are scraped off, leaving the scar tissue base, and failure results. (Figs. 10, 11, 12, 13, 14.)

In children with burns of the extremities we believe that primary attention should be given to the granulating surfaces, and that if contractures tend to occur, daily gentle manual extension by both physician and nurse is preferable to any retention apparatus. After the skin is reformed, an apparatus or operation may be easily devised to overcome the contractures. The following two cases illustrate these factors:

REPORT OF CASES

CASE 1.—(Figs. 4-5-6) V. K., a girl, aged 10, was admitted to the Lincoln Hospital on Jan. 1, 1925, with second and third degree burns caused by hot water over the buttocks, thighs, legs, feet and left hand. At this time we had not adopted the treatment with tannic acid. On the sixth day she was intensely toxic and so ill that we doubted that she would live twenty-four hours. Under light anaesthesia the typical pigskin burned area on both thighs was excised down to the fascia. Wet dressings were then immediately applied. This was followed by a blood transfusion of 250 c.c. The next day her condition was markedly improved and the signs of toxaemia gradually disappeared. While she was in the hospital she received six transfusions and at least ten operations were performed for skin-grafting, pinch grafts being used. She developed moderate contractures of both knees, and after the area was entirely epithelialized she was repeatedly taken to the operating room and her legs partially straightened under anaesthesia. If the skin tore in the popliteal space the area was immediately

grafted and retentive apparatus applied. This operative procedure was repeated several times, until the contractures were corrected. She is now well, and the flexion and extension in both knee joints is perfect.

CASE 2.—(Figs. 8 to 13) T. T., a boy, aged 3 years, was admitted to the Lincoln Hospital on Nov. 14, 1925. He was extensively burned from the abdomen to one inch above the ankle joint. Tannic acid dressings were applied. As the burns were of the third degree type, the membrane gradually separated, leaving extensive granulating surfaces. As he was developing contractures of both knees, it was thought advisable to attempt a Bryant overhead traction, suspending him by stirrups about the feet. Almost immediately he developed pressure sores over the os calcis and the anterior surface of the foot, with resultant edema of the feet and toes. In an attempt to treat the patient for the edema of the foot, grafting of skin on the granulating areas of the thighs was delayed for a long period. Our earliest attempts at grafting skin were failures, although the surfaces had been thoroughly curetted. We then decided that the failure was due to the formation of scar tissue beneath the granulating tissue. Therefore, by sharp dissection, the scar and granulating tissue down to his fascia lata were excised, and skin was immediately grafted on the area. This was followed by success. During the period of two years this child has been subjected to about fifteen operations for skin-grafting and numerous transfusions.

In children with extensive burns who have not much normal skin that can be found for grafts, we have found that pinch grafts can be inserted about 1 cm. from each other and that epithelialization will occur from each graft, bridging the defect. It is better to attempt small areas at a time, repeated operations being performed. The extremity should be immobilized and dressings so applied that there will be no movement of the grafts, and sufficient pressure must be used to prevent the accumulation of serum beneath them. On the other hand, as has been emphasized by Davis, the pressure should not be great enough to interfere with capillary circulation, so that the grafts may receive their blood supply. We have found it advisable always to excise the scar tissue near the advancing edge of epithelium, because if grafts are planted in the center of the granulating surface, they are gradually

FIG. 14 (Case 2). High powered view of fat showing (*a*) large cells with clear cytoplasm, infiltration of fat; and *b*, perivascular infiltration of leukocytes, and *c*, fascia lata.

choked off by the surrounding exuberant granulating tissues. (Figs. 10, 11, 12, 13 and 14 show clearly the pathological condition in this case.) A curet would have merely scraped off the superficial granulating area and left behind the dense scar tissue base. At one time the contractures about the knee joints in case 2 were alarming, but by numerous moderate stretchings, with immediate grafting of the rents in the popliteal space and the application of splints to maintain the improved positions, the patient can now completely extend both legs. If we had originally treated the granulating areas to prevent infection and had grafted them early, the patient's period of hospitalization and disability would have been greatly diminished.

These two cases are presented as contrasts. The child in one case was treated primarily by debridement—an inferior method—but skin was immediately grafted and the contractures were repaired following the epithelization. The child in case 2 was treated by tannic acid—a primarily satisfactory method—but in our attempt to prevent contractures the epithelization of the granulating areas was neglected and his period of hospitalization and deformity was greatly prolonged thereby.

CONCLUSIONS

In conclusion I wish to recommend the use of tannic acid in the treatment of burns—

1—Because it diminishes pain;
2—Because it prevents fluid depletion;
3—Because it decreases toxaemia; and
4—In second and third degree burns it allows epithelization to proceed while the membrane is in place.

I wish to emphasize the necessity of using tannic acid in the first aid treatment, in place of oils or ointments, because it is very much more difficult to treat satisfactorily a burn with tannic acid after a first aid treatment of carron oil or ointment. Roughly, a 5% solution may be made by adding five teaspoonsful of tannic acid powder to a glassful of water.

DISCUSSION

PRESIDENT DALTON: I will ask Dr. Stewart to open the discussion of Dr. Bancroft's paper.

DR. STEWART: As one of the younger members of the Society I consider it an honor to be asked to discuss a paper by Dr. Bancroft, but my actual experience does not make me feel competent to do so, because I have had only two severe cases of burns, treated with ointment. One was quite severe, and died, and the other was treated with picric acid. Most of us neglect burns, we don't see many of them and don't get a chance to compare notes. Most of the men in this vicinity treat burns with ointments, which Dr. Bancroft has shown us is an inferior method. The ointments are very convenient for treatment. The solutions for treatment of burns are probably not used so much because in carrying them in cases, if the bottles get broken, the solution soils everything else. Dr. Bancroft has given us a very simple method. All we have to do is to carry the powder in our bags and make the solution in the home. Dr. Bancroft has given us a very excellent paper, and I am sure his talk will enable us to help our patients.

PRESIDENT DALTON: Dr. Sample, of St. Albans? (Not present.) Has anyone else anything to offer in regard to this subject?

DR. HAMILTON: I have had the privilege of seeing many cases treated by Dr. Bancroft, and a large series showed different results than we get in any other treatment. I have used that method only once, and the results were much better than I ever had in any other method of treatment. The results that Dr. Bancroft got in skin-grafting after using tannic acid were miraculous,—much better than anything we have ever had before.

DR. BANCROFT: Those of us who treat burns the other way, and know the painful dressing that we have to do the first week, will be astonished at the almost complete relief from pain, and the comfortable attitude of a child during the first week or ten days, with the tannic acid membrane on. The other consideration is that if infection occurs, you must treat the infection.

MISCELLANY

VERMONT DEPARTMENT OF PUBLIC HEALTH. MARCH, 1930

Communicable diseases reported to this Department during the month of March are as follows: Chickenpox 228, diphtheria 6, German measles 6, measles 142, mumps 20, scarlet fever 49, smallpox 15, tuberculosis 19 and whooping cough 26.

The Laboratory of Hygiene made a total of 1,568 examinations during the month, classified as follows:

Examinations	
For diphtheria bacilli	134
For Widal reaction of typhoid fever	23
For tubercle bacilli	252
For evidence of syphilis	374
For evidence of gonococci in pus	126
Of blood for contagious abortion in cattle	199
Of water, chemical and bacteriological	31
Of water, bacteriological	123
Of milk, market	177
Of milk, submitted for chemical only	3
Of milk, submitted for microscopical only	0
Of foods	29
Of drugs	0
For the courts, autopsies	1
For the courts, miscellaneous	10
Autopsies to complete death returns	1
Of animal heads for evidence of rabies	0
Miscellaneous	85

The Division of Communicable Diseases received reports of 34 cases of gonorrhea and 35 cases of syphilis. There were 300 Wassermann outfits and 152 slides for smears sent out from this division.

In the Division of After-care for Infantile Paralysis 62 patients were seen, 64 home visits were made, 6 plaster casts removed, 17 orthopedic corrections made to shoes, 7 pieces of apparatus repaired or altered. Seven patients were admitted to hospitals and nine patients discharged from hospitals.

Several days were spent with Home Demonstration Agents in various counties and plans have been made for preschool conferences during the coming summer. An intensive course on "Growth and Development of the Child from Two to Six Years" was sponsored by the Woman's Club in one of the towns of the state. Plans are being made for the observance of National Child Health Day.

MEETING OF THE BARRE CITY HOSPITAL TRUSTEES

At the meeting of the board of trustees of the Barre City Hospital which was held recently, plans were outlined for the building of a maternity wing which will relieve the crowded condition in the main building. Funds needed to erect this much needed wing will reach $100,000. The period of the campaign for this fund will be from May 16 to May 24. James G. Pirie will head the campaign executive committee as general chairman of the project. This idea has been under contemplation for some time, but it is felt that it should not be delayed longer. Besides the $100,000, $28,000 is needed to pay the debt incurred by the present building. Statistics show that at the Barre City Hospital, during the last year, 1,300 patients were treated, and that approximately one-third of them were from the towns surrounding Barre. The towns using this hospital service are Berlin, East Brookfield, Cabot, East Calais, Marshfield, Orange, West Topsham, Washington, Chelsea, Williamstown, East Montpelier and Plainfield. Immediate steps in organizing the campaign are being taken.

BENNINGTON COUNTY MEDICAL SOCIETY

The Bennington County Medical Society held its regular monthly meeting March 26 at the Putnam Hospital, Bennington, Vt.

Cases were shown and discussed as follows:

Arthritis of tonsillar origin in a girl 12 years of age (Dr. Goodall).

Comminuted fracture of femur in a young man, fracture received while skiing (Dr. Lane).

Chest injury with fracture of six ribs (Dr. Buchanan).

A Case of Ascaris Lumbricoides (Dr. Kellert).

The symptoms in Dr. Kellert's case closely resembled those of cholecystitis at first. The stools were examined for ova which were found. An anthelmintic expelled the parasites and the symptoms abated.

JOHN D. LANE, M.D.

NEWS ITEMS

Dr. Parker, of the College of Surgeons, was in Barre recently inspecting the Barre City Hospital which was put on the approved list.

Dr. J. A. Wark and Dr. W. E. Lazell of Barre attended the meetings of the New England Health Institute in Boston.

Dr. M. D. Lamb, Health Officer of Barre, is at the Mary Fletcher Hospital in Burlington for observation and treatment. The latest reports are that he is gaining.

Dr. and Mrs. Ladd, of the Vermont State Hospital, celebrated their silver wedding anniversary in March. Early in April they left by automobile for Berea, Kentucky, where they will spend the month with their daughter and her husband, Dr. and Mrs. John Armstrong, who were at one time at the Vermont State Hospital. Mrs. Ladd's sister, Mrs. Pope of Boston, will join them in Brandon and accompany them on their trip.

RECENT DEATH

Dr. Sumner E. Darling died April 8, 1930, at Hardwick, Vt., after four years of failing health, during which time he did office work and lighter forms of practice.

Dr. Darling was born in West Windsor, May 2, 1856. As was customary at that period, he studied under preceptors,—Dr. M. L. Chandler of Woodstock, and Dr. Henry D. Holton of Brattleboro.

He received his medical education at Dartmouth and University of Vermont, where he graduated in 1882.

He practiced for a time in Newbury, Vermont, moving to Hardwick in 1884, where he was a successful practitioner the rest of his life.

He was Health Officer for twenty-two years and was always deeply interested in preventive medicine.

He was appointed, in 1905, a member of the state Tuberculosis Commission, receiving his appointment from Governor Bell. He was a member of County, State and American Medical Associations. In politics he was a Republican, representing his town in 1904 and Caledonia county, in the State Senate in 1910.

In 1881 he married Evelyn R. Eastman of Newbury, who survives him with one son, Sumner E. Darling, Jr., a practicing attorney of Hardwick.

Case Records
of the
Massachusetts General Hospital

ANTE-MORTEM AND POST-MORTEM RECORDS AS USED IN WEEKLY CLINICO-PATHOLOGICAL EXERCISES

EDITED BY R. C. CABOT, M.D.

F. M. PAINTER, A.B., ASSISTANT EDITOR

CASE 16171

DYSPNEA AND EDEMA IN A CHILD OF THIRTEEN

MEDICAL DEPARTMENT

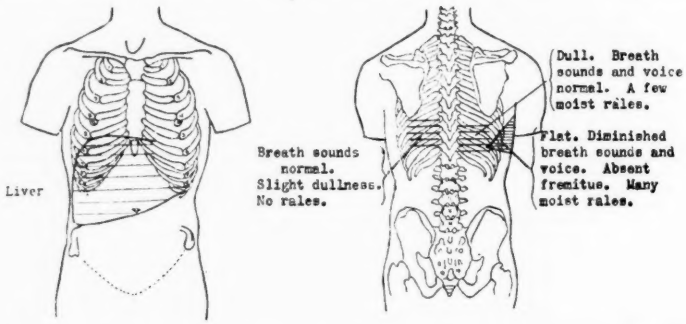
An Italian-American schoolgirl thirteen years old entered October 22 complaining of shortness of breath and swelling of the abdomen and legs.

March 23, seven months before admission, she noticed some red spots over her body varying from the size of a pinhead to an inch in diameter. There was considerable itching. She felt well. The following night she awoke with a desire to urinate and noticed some stiffness and soreness of the left ankle joint. The pain increased and involved in turn the left ankle, knee, elbow, wrist and metacarpophalangeal joints. The joints became painful, hot, swollen and red. With each fresh involvement there was a new crop of red spots. She was in bed for three months, although the pain lasted only three weeks. Since May she had been up at times but had never tried to take much exercise. After this attack she found she required more pillows at night. At admission she was using four. Since the attack she had noticed an apparent hardening of the fingertips during damp weather. Two and a half weeks before admission she had unproductive cough. A week before admission her feet and legs swelled during the day if she was up. Three days before admission she found her abdomen was increasing in size.

The family history is not significant.

Her general health had been good. She had had the mild diseases of childhood. Four years before admission she had tonsillectomy and adenoidectomy. For five years she had worn glasses for strabismus of the left eye which came on following measles. She had occasional colds, hoarseness and night sweats. Before the present illness she weighed 128 pounds, her best weight. Two and a half months before admission she weighed 107 pounds.

Clinical examination showed a well nourished, very pale, slightly cyanotic, orthopneic young girl sitting nearly upright in bed. Left internal strabismus. Teeth carious. Lung signs as shown in the diagram. Heart much enlarged, round. Apex impulse seen and felt in the 4th space 12 centimeters from midsternum, 5 centimeters outside the midclavicular line. Left border of dullness 12.5 centimeters, right border 4.5 centimeters, supracardiac dullness 4 centimeters. Action very rapid, forceful. Rhythm regular. Sounds not very good in quality. Visible pulsation over a large area of precordium and considerable pulsation in the neck vessels. Pulmonic second sound greater than aortic second. A presystolic thrill at the apex. A loud rough systolic murmur heard at the apex and also at the tricuspid area, transmitted almost all over the chest. Rate too rapid to make out presystolic murmur if it were present. Blood pressure 118/84 to 100/76. Later a marked gallop rhythm was noted and a presystolic murmur was heard at the apex. An electrocardiogram showed sino-auricular tachycardia; rate 140, rather small complexes. Vital capacity 550 to 500 cubic centimeters, average 530 cubic centimeters. Abdomen full. Slight fluid wave. The conformation suggested fluid. No shifting dullness, however. Liver from the 4th rib to 2 centimeters below the umbilicus, somewhat tender, with some pulsation, possibly transmitted. Spleen not made out. Pitting edema to the knees. Thighs felt slightly boggy. Edema over the sacrum. Rectal and vaginal examinations not done. Pupils normal. Knee jerks and ankle jerks absent. Bilateral Babinski.


Liver
Breath sounds normal. Slight dullness. No rales.
Dull. Breath sounds and voice normal. A few moist rales.
Flat. Diminished breath sounds and voice. Absent fremitus. Many moist rales.

Urine: amount normal, specific gravity 1.010 to 1.032, red at the first of three examinations, a trace of albumin at two, a slight trace at one, the slightest possible trace of diacetic acid once, three to four red cells once, five to ten leukocytes at all three examinations. Renal function 12 per cent. Blood: 8,800 to 25,400 leukocytes, 72 per cent polymorphonuclears, hemoglobin 80 to 90 per cent, reds 6,050,000 to 5,350,000, platelets apparently normal. Hinton negative.

Temperature 100.4° to 95° to 101°. Pulse 110 to 140. Respirations 20 to 48.

X-ray examination showed the diaphragm visible on both sides. The costophrenic sinuses were not obliterated. The lung fields were less radiant than normal, particularly at the roots and the bases. The heart shadow was markedly increased in size, more to the left than to the right. The outlines of the various chambers were not visible.

The patient was comfortable, though slightly orthopneic. October 24 a systolic and a faint early diastolic murmur were heard in the second and third left spaces. A cardiac consultant thought a trial of salyrgan was justified. A test dose produced no diuresis. The condition improved only slightly. October 30 the heart was very rapid and forceful. The extremities were cold, although the patient felt hot. November 2 she died.

Clinical Discussion

BY WILLIAM B. BREED, M.D.

NOTES ON THE HISTORY

This history is in practically every way a typical picture of rheumatic fever, including even the rash which came in crops with each new involvement of the joints. We do not see so much rash in rheumatic fever here as they do in England. The more typical picture of rheumatic fever in this country is one of fever, malaise and heart disease rather than joints, nodules and manifestations of that sort. This apparently was a rather acute attack of rheumatic fever. Of course the question whether or not she has bacterial endocarditis with petechiae cannot be ruled out until we go farther.

There is nothing said here as to whether the hardening of the finger-tips was associated with some clubbing. It is possible she is developing an acute bacterial endocarditis. But so far there is certainly no direct evidence that she has other than very acute rheumatic infection.

It would be of interest to know why she had her tonsils and adenoids out, whether they were taken out because of frequent sore throats or nasopharyngeal obstruction. Years before she may have had rheumatic infection without joint symptoms and developed rheumatic heart disease at that time. It is also interesting to know that tonsillectomy apparently had no curative effect on any attacks of rheumatic infection which she might have.

NOTES ON THE PHYSICAL EXAMINATION

All that can be got from the lung signs here is that she has some chronic passive congestion and possibly a small amount of fluid. But I should think rather they were compression signs from a high diaphragm and an enlarged liver.

That is a very large cardiac area. Whether or not there is a true enlargement to the left and to the right as extreme as this is open to question, because she has some ascites, the heart is pushed upward and outward and it may be she has not quite so large a heart as it appears. The observation that the heart was round is not of particular importance because it is very difficult to determine whether a heart is round on physical examination. I think the very forceful beat and the fact that the apex impulse was seen and felt are evidence against pericarditis, suggested by the remark that the dullness of the heart is round.

She certainly presented a picture of decompensated heart with infection. You will note further along that the temperature was 100.4° to 95°. It is a very significant thing that this girl of thirteen is suffering from cardiac decompensation in the presence of fever. Children with rheumatic heart disease practically never die or become decompensated without having an infection. That is, their heart muscles do not break down from mechanical causes and it is only in the presence of a recurrent infection that they go to pieces. If this girl did not show any signs of infection this would be a very unusual case of decompensation.

I am unable to say here that she has pericarditis because I do not see any evidence of it. So far the only suggestion of it is the very large region of cardiac dullness and the note that it is round. If she had a massive pericarditis we might look for signs at the left back suggesting consolidation. In children the diagnosis of pneumonia on the left is often made, the signs being produced by pericarditis resulting in compression of the lung.

The redness of the urine in the absence of any more than a few red blood cells cannot be properly interpreted. It may have been a highly concentrated specimen.

There is a trace of albumin. Diacetic acid in the presence of any infection regardless of whether any salicylates have been used is to be expected and ignored.

There is certainly no evidence here that she has any primary nephritis. The variation of the specific gravity is wide. There is no appreciable amount of blood and there are no casts. The renal function of 12 per cent can be accounted for by chronic passive congestion. She shows a leukocytosis which is consistent with acute infection of this sort. Both the hemoglobin and the high red count can be accounted for on the basis of faulty circulation due to heart disease.

If the X-ray findings are correct they practically rule out any free fluid in the pleural cavity. The fact that the lung fields were less radiant than normal is consistent with congestion. The fact that the heart chambers are not visible is X-ray evidence of pericarditis, but nothing definite is said about that.

DIFFERENTIAL DIAGNOSIS

The impression that comes from this whole picture is that she may perfectly well have had

rheumatic heart disease prior to the onset of her illness in March, seven months before admission. The fact that she had tonsillectomy for some reason or other would indicate that that may have been the cause of her endocarditis and that this thing may be an exacerbation of the rheumatic infection. Whether or not she has a bacterial endocarditis is somewhat problematical. But the whole picture can be explained on the basis of a rapidly moving rheumatic infection. I do not understand this note that during the damp weather she had had hardening of the fingertips. There is nothing at all in the physical examination as to the condition of her fingers. If she had subacute bacterial endocarditis enough to have made her notice her fingers she would have shown some clubbing.

MISS PAINTER: The record notes definitely "not clubbed".

DR. BREED: I do not understand that note "hardening of the fingertips in damp weather".

The crops of rash that appeared with involvement of the knee joints seem to me more suggestive of toxic rash with rheumatic infection than of any embolic process. There is no evidence that she has emboli in the kidney; there is not enough blood to indicate that. There is no note made in the hospital about petechial spots. Of course we do not know whether the spleen was enlarged or not because of the large amount of fluid.

I think that so far as I am concerned this thing is pretty clear cut except for the question as to whether she had pericarditis or not. The fact that someone indicated there was a round cardiac percussion area in the physical examination and X-ray showed obliteration of the outline of the various heart chambers is in favor of pericarditis. No note of a rub was made. But I think on the whole that her rapid progress downhill and the fact that she had perhaps predominantly more ascites than edema of the extremities are points in favor of a diagnosis of pericarditis. I think we can say that this girl died of acute rheumatic infection with mitral stenosis and regurgitation and on pathological chances not any tricuspid valve damage in spite of the fact that there were murmurs over the tricuspid area and some pulsation of the liver. The occurrence of tricuspid valve involvement is in my experience very infrequent. I have never seen a proved case, and should be unwilling to make that diagnosis in this case. She had a dilated and hypertrophied heart, some pericarditis and ascites and cardiac decompensation.

A STUDENT: How about this condition of primary purpura rheumatica associated with red spots, joint manifestations and itching of the skin?

DR. BREED: I should be willing to call it that. It is associated with rheumatic infection sometimes. I do not know why you call it primary purpura rheumatica.

DR. MALLORY: Isn't it called Schönlein's purpura?

DR. BREED: No one doubts that this patient has rheumatic heart disease, and it would seem to me rather a confusion of terms to add another diagnosis. Do you know the cause of that disease?

A STUDENT: The established theory is that it is rheumatic in origin and rarely associated with rheumatic heart disease.

DR. BREED: That suggestion is so confusing that we had probably better not approach it.

A STUDENT: What about the neurological findings?

DR. BREED: That bilateral Babinski means nothing at all to me. I think sometimes in children the Babinski may be positive without having any demonstrable cause whatever. I should throw that observation out as having no bearing on the diagnosis.

A STUDENT: Is there any possibility of chorea?

DR. BREED: I do not see any evidence in the history. Of course a positive Babinski in itself has no particular association with chorea. A great many cases of chorea do not have a Babinski and a great many normal children do have it. You are right in saying that chorea and rheumatic infection if not due to the same thing are very closely connected.

A STUDENT: Are absent ankle and knee jerks due to her moribund state?

DR. BREED: They certainly indicate no neurological pathology to me.

A STUDENT: Is that a common occurrence in people who are very ill?

DR. BREED: I should not say common, but I am sure it occurs often. Those isolated neurological observations are turning up all the time and cannot be given any significance unless they are associated with something else which makes them sound reasonable.

A STUDENT: The temperature ranged from 101° to 95°. Is that wide swing of any significance?

DR. BREED: The lowest reading was a terminal one.

CLINICAL DIAGNOSES (FROM HOSPITAL RECORD)

Rheumatic heart disease.
Mitral stenosis and regurgitation.
Congestive failure.
Tricuspid disease (?).

DR. WILLIAM B. BREED'S DIAGNOSES

Acute rheumatic infection.
Acute rheumatic heart disease, mitral stenosis and regurgitation.
Hypertrophy and dilatation.
Acute pericarditis.
Cardiac decompensation.

ANATOMIC DIAGNOSES

1. *Primary disease.*

Beginning Pick's disease or polyserositis, i.e.:
Acute and chronic rheumatic endocarditis.
Acute myocarditis.
Pericarditis.
Rheumatic pleuritis.
Rheumatic peritonitis.

2. *Secondary or terminal lesions.*

Focal pneumonia.
Passive congestion of the liver.
Focal glomerular nephritis.
Acute tubular degeneration of the kidneys.

PATHOLOGIC DISCUSSION

BY TRACY B. MALLORY, M.D.

This child did have an acute rheumatic heart disease with acute endocarditis, myocarditis, pericarditis; also, as is not very rare, rheumatic pleuritis and rheumatic peritonitis. The latter was least pronounced. This is the beginning of the syndrome sometimes called Pick's disease or multiple serositis.

The heart was very much enlarged, weighing 510 grams, which was a very high figure for a girl of her age. Every one of the four valves showed the acute rheumatic granules and no one of the four showed any degree of either stenosis or insufficiency. It is a little hard to account for that presystolic murmur and thrill.

The other organs showed the expected changes of chronic passive congestion. Nothing else was at all striking.

DR. BREED: This must have been a very acute, rapidly progressive disease. Is it not unusual to find the other valves involved in straight rheumatic heart disease?

DR. MALLORY: It is distinctly out of the ordinary. Of course they go in regular order of frequency. The mitral is much the commonest, the aortic a little behind it, the tricuspid far behind that and the pulmonary still behind that. It is rather unusual to get a uniform process on all four valves such as we had here. The myocardium showed many Aschoff bodies, typical of rheumatic myocarditis. Every portion of the cardiac system was involved. I should imagine that so far as the immediate cause of death was concerned the involvement of the myocardium was the most important factor.

A STUDENT: Her urine was red at one examination. How do you account for the absence of red cells?

DR. MALLORY: It depends on who calls it red more than anything else. High-colored urine is often called red by the patient. Also lysis of cells may occur if the specimen is not promptly examined.

A STUDENT: Was any organism isolated from the myocarditis or endocarditis?

DR. MALLORY: I do not think there was. There is no record of it here.

ORDERS

October 22. Soft solid diet. Fluids to ounces xl. Bed. Blood pressure every two days. Digitalis grains iss t.i.d. until pulse is below 90. Cough mixture* one dram every three hours p.r.n. Digitalis grains iii immediately.

October 23. Weigh every three days. Cough mixture as above dram i. Theocin grains v daily for three days. Codeine grain ss by mouth every three hours p.r.n. for cough.

October 24 and 25. Codeine grain ss by mouth. Digitalis grains iii t.i.d.

October 26. Digitalis grain iss twice a day. Codeine grain ss by mouth every three hours p.r.n. for cough.

October 27. Digitalis grains iii twice a day. Salyrgan 0.5 c.c. intramuscularly. Codeine as on October 26.

October 28. Digitalis and codeine as on October 27.

October 30. Digitalis grains iii twice a day. Morphia grain one-eighth s.c. Caffeine grains iii by mouth every three hours unless restless. Very soft solid diet.

October 31. Digitalis iss twice a day. Daily blood pressure. Morphia one-eighth grain after meals p.r.n. for pain or restlessness. Codeine grain ss by mouth. Morphia one-eighth grain s.c., two doses.

NOTES ON THE TREATMENT, BY DR. BREED

Examination of the orders shows that a determined effort was made to digitalize this patient. It is not quite clear from these day orders how much digitalis she received, therefore no conclusions can be drawn as to whether she had enough or not.

On October 27 0.5 cubic centimeters of salyrgan was given intramuscularly. In the first place it is to be noted that this drug is given more advantageously intravenously, provided of course it is given properly. There is no record of any other administration. Normally one would proceed with one cubic centimeter as a second dose, giving it twice a week for a matter of two weeks before any conclusions about its efficacy could be reached. The record does not state that it was not tolerated well, and more may have been given without any record being made. It is a very valuable drug, especially in the treatment of ascites without kidney damage, and in certain cases of ascites due to cirrhosis the effect is magical. Certain cases do not react well to it. It should of course be given a thorough trial in each case where one feels that the kidneys will tolerate it.

*Codeine phosphate grains viii, potassium citrate drams iii, syrup of hydriodic acid to make ounces iv.

CASE 16172

GASTRO-INTESTINAL SYMPTOMS WITH AN EPIGASTRIC MASS AND NEGATIVE X-RAY FINDINGS

Medical Department

Presentation of Case

Dr. John E. Howard*: This patient was a sixty-two-year-old married Irish housewife. She came in complaining of vomiting and weakness of three weeks' duration.

She had been in good health until three months before admission, at which time she began to feel weak and to lose appetite and weight. The smell of food, particularly meat, made her slightly nauseated. She had lived on oysters, gruel and soup for six weeks previous to entry. Before the sudden onset she had been working as a laundress. Three weeks ago she felt more nauseated, and vomited several times with no relation to food or anything else. She was so weak that she went to bed. The vomitus never at any time contained blood or old food.

On examination she showed considerable loss of weight, but her color was maintained. The examination of the abdomen is the interesting feature. The liver was down to the iliac crest, extremely hard, irregular, nodular. In the left epigastrium almost at the midline on very deep palpation there could be felt an irregular mass which felt hard, though it was so deep that we could not feel it very well. It was about the size of a small fist and descended on respiration.

The story seemed to point to carcinoma of the stomach. A gastro-intestinal X-ray series showed the stomach perfectly normal, as was also the duodenum. The barium failed to come out in four days in spite of enemas. She had no symptoms. Fluoroscopic examination showed the whole lower gastro-intestinal tract perfectly outlined, just as if the barium had been given for that examination. Soon after fluoroscopy normal movements were resumed.

Four days after admission the patient had right hemiplegia, no convulsions or any other symptoms. She gradually went downhill. There was no obstruction in her gastro-intestinal tract. She did not vomit at all in the ward. On the third day there was a right pleural friction rub with pain on inspiration over the lower ribs anteriorly and in the right shoulder. We could not tell whether it was due to irritation above or below the diaphragm. This disappeared and she gradually sank into a comatose state. She died in two weeks. No radical therapy at all was considered. We merely attempted to keep her comfortable while in the ward.

A Physician: Was there any anemia?

Dr. Howard: There was a moderate secondary anemia.

A Physician: Was there any evidence of cerebral thrombosis or hemorrhage?

*Senior interne on the West Medical Service.

Dr. Howard: There was moderate hypertension, on entry blood pressure 170/95, after hemiplegia 130/80. The hemiplegia came on so insidiously that we assumed cerebral thrombosis was the cause.

Clinical Diagnoses (from hospital record)

Carcinoma of the liver, primary in the pancreas?
Left hemiplegia.
Generalized arteriosclerosis.

Anatomic Diagnosis

Carcinoma of the pancreas.

Discussion

Dr. Tracy B. Mallory: The autopsy was limited simply to an abdominal incision and inspection, with removal only of pieces for microscopic examination. There was a tumor of the pancreas, mostly in the body and tail.

One reason why I thought this case would be interesting to bring up is that Dr. Holmes has lately called our attention to the frequency of cases of cancer of the pancreas discussed in our conferences. Dr. Bradley has counted up the cases. In the last seven hundred autopsies we have had fourteen cancers of the pancreas as against seventeen of the stomach. In the usual statistics of autopsy findings such as Ewing quotes, cancer of the stomach is estimated at 20 to 40 per cent of all cancers, an average of 23 per cent. Cancers of the pancreas are estimated at only 1 to 2 per cent of all cancer. In general, cancer of the stomach seems to be ten to fifteen times as common as cancer of the pancreas; and yet in the past four years here we have had practically as many of them. We then looked back in the earlier autopsies and found in the first five thousand autopsies forty-five cancers of the pancreas and 141 of the stomach, that is, about three of the stomach to two of the pancreas. I do not know what the reason for our high figures is. Certainly our proportion is much higher than it is in most clinics and it seems to be becoming increasingly so.

It is rather interesting that in the last fourteen cancers of the pancreas six showed no jaundice,—nearly half.

Dr. Howard: This patient showed no jaundice.

Dr. Mallory: It is also rather interesting that approximately two-thirds of the patients died within a very few days of operation even though the operation was only exploratory. The duration of the disease after diagnosis and exploration is a matter of days in most instances.

A Physician: Is the liver bed involved?

Dr. Mallory: In the majority of cases, though not quite all.

A Physician: Did the rapidly fatal cases show jaundice?

Dr. Mallory: Most of them. The ones with-

out jaundice are rarely operated on as a matter of fact.

DR. GEORGE W. HOLMES: My impression is that cancer of the stomach is at least ten to fifteen times as common as cancer of the pancreas. I should think that in our clinic cancer is certainly very much more common in the stomach. Don't you think there are a good many cases of cancer of the stomach that do not come to autopsy?

DR. MALLORY: Even granting that, don't you think the number of cases of cancer of the pancreas is very high? Are there any of these you have been able to get anywhere with by X-ray?

DR. HOLMES: We occasionally make a diagnosis of tumor in the pancreas, particularly if the duodenal loop is very wide and there is evidence of obstruction. We cannot tell whether it is a malignant or a benign tumor. In some cases of cancer of the tail of the pancreas there is an X-ray picture that is suggestive. I think we make the diagnosis of tumor of the pancreas with a fair degree of frequency.

DR. CHESTER M. JONES: It is probably true that a great many patients with pancreatic tumor live for a relatively long time before they come here; don't you think so? One of those cases came in last year. The patient had had an exploratory operation at the hospital two and a half years before, and was able to work a little and live with reasonable comfort until his admission last fall.

A STUDENT: How quickly can you get hemiplegia from metastasis?

DR. HOLMES: We think about that in this case. I think it is most unlikely. Metastasis from cancer of the pancreas is rare because the course is rapid.

CONVALESCENT HOME OF THE CHILDREN'S HOSPITAL, WELLESLEY HILLS, MASSACHUSETTS

The Convalescent Home of the Children's Hospital will add a babies' department to its already extensive work at the hospital in Wellesley Hills according to a statement made today by Mrs. George H. Monks, president of the Home, before leaving for a three months' visit to the continent. This addition will be ready to receive the infants during the latter part of June or the first of July. A room in the building which is now used for teaching purposes will be renovated, redecorated and fitted with plumbing equipment necessary for complete attention of the babies and when finished will accommodate about twelve infants.

Up to very recently it has not been the policy of the Home to care for children under two years and the nurses have been receiving training in the care of infants at the North Shore Babies' Hospital.

The infants are to be taken for four months during the summer of each year when the schoolroom can be used for this purpose. Work on the new room will begin this week.

Mrs. Alexander Whiteside, chairman of the publicity committee, stated today that this change will not necessitate the enrollment of more nurses as the graduate nurses at the Home have volunteered to assist in the work. Additional nursemaids, however, will have an opportunity to train.

The officials of the home include Mrs. George H. Monks, president; Miss Mary B. Lothrop, vice president; Mrs. Robert Amory, secretary; Samuel H. Hooper, treasurer; and Mrs. I. McD. Garfield, assistant treasurer.

VENTILATION LAWS

The heating and ventilation of schools has been and still is the most troublesome problem in school hygiene. In the nineties the carbon dioxide of the air, if not looked upon as a menace in itself, was at any rate set down by the ablest sanitarians as a definite gauge of the degree of toxicity of the air caused by human "effluvia". When it was formulated by science that, in order to keep the carbon dioxide down to a certain concentration, and hence the poisonous animal matter in the air at a safe dilution, each child must have delivered to him 2,000 cubic feet of fresh air per minute, there was something definite on which to set up legislation. In consequence, ventilation laws or regulations on this subject were formulated by 31 States and in 20 of these States a standard was set of 30 cubic feet of air supply per minute.

Although set up by the authority of science, scientists, or at any rate some scientists, after only a quarter of a century seem to regret that these specific requirements were ever put into effect and would demand their revocation. It is worth noting that for a number of weeks of the school year (when the furnaces are not in operation and when the health of the pupil is apparently at its best) the required amount of air is never delivered to the pupils. The doubt that has been thrown by recent studies on the value of the ventilation requirements of these laws (when the laws are fulfilled) should put a damper on legislation which is too specific in its demands.—*United States Department of the Interior. Office of Education.*

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CHILDHOOD TYPE OF TUBERCULOSIS

THE best treatise, unquestionably, which has yet been produced on childhood tuberculosis has recently been written by Dr. Henry D. Chadwick and Dr. F. Maurice McPhedran, and distributed by the National Tuberculosis Association. Dr. Chadwick, as we all know, was formerly superintendent of the Westfield Sanatorium and is now director of the Ten Year Program of Diagnostic Clinics organized by the Massachusetts Department of Public Health six years ago. Dr. McPhedran is associated with the Phipps Institute.

The American Sanatorium Association has adopted and recommended for general use the term "childhood type of tuberculosis" to describe the diffuse or nodular lesions in the lungs and associated tracheobronchial lymph glands that result from a first infection of the pulmonary tissue with tubercle bacilli. This term is intended to replace such terms as infantile, juvenile or hilum tuberculosis, and specifically includes tuberculous lesions of the tracheobronchial glands. The childhood type is usually found in children, rarely in white adults, although not uncommonly in adult negroes.

The sequence of events in primary tuberculous infection is described; first, the formation within the parenchyma, usually adjacent to the pleura of one or more foci of tuberculous tissue, with a central caseation; second, peripheral spread in unfavorable cases and fibrous capsulation in favorable ones; third, a deposit of calcium usually occurring in the caseous nodule. A similar series of events takes place practically simultaneously in the tracheobronchial lymph nodes that drain the diseased area, and since the primary lesion may be so small that it escapes notice, masses in the hilum may be the only evidences of disease shown.

The differences between the childhood and adult types are distinctly worthy of note and may with value be taken directly from the manual.

Childhood Type	*Adult Type*
Usually occurs in children, but rarely in adults.	Usually occurs in adults but may be found in children.
Result of a primary infection.	Result of a reinfection.
May be localized in any part of the lung.	Localization is apical, extending along the pleura, often postero-laterally. The first clinical manifestation, however, is often in the infraclavicular space.
Associated tracheobronchial lymph nodes are always involved but may not be demonstrable.	Tracheobronchial lymph nodes not involved by this reinfection except sometimes in the terminal stage.
Caseous lesions usually become calcified or incapsulated in fibrous tissue.	Caseous lesions usually followed by excavation or fibrosis or both.
Infiltrated areas commonly resolve, leaving trivial or no scars except for the foci of caseation, which usually become calcified.	Infiltrated areas may resolve with the production of more or less fibrous tissue.
Prognosis good.	Prognosis in children is poor.

The value is stressed of the x-ray, without which a positive diagnosis of the childhood type of tuberculosis cannot be made; in fact, the diagnosis is held to depend upon the consideration of six factors; history, symptoms, physical signs, tuberculin test, x-ray evidence, and the exclusion of other causes which might produce similar conditions.

The frequency of pleuritic effusion would be rather surprising to the average observer, the roentgenograms of 8,838 Massachusetts school children from five to fifteen years of age having shown one in 736 to have pleural effusion. Since these children were all attending school they could not have been considered by their parents to be ill.

The method of preparing, applying and interpreting the Mantoux intracutaneous tuberculin

test as employed at Henry Phipps Institute is described with a brief summary of the Pirquet method. The Mantoux reactions are illustrated by very excellent colored plates.

Perhaps most striking and valuable of all the admirable contents of the brochure is the series of six remarkable roentgenograms illustrating various tuberculous lesions, and accompanied by interpretive diagrams. These alone would make the manual worth preserving in any medical practitioner's library.

A description of case finding as practiced in Massachusetts, where already one hundred thousand school children have been examined in the Diagnostic Clinics of the State Department of Public Health, is appended.

Details of the manual cannot be set forth in this space; to be appreciated it must be read, and in any reference to the subject we must not forget that the objective of national effort this month is the protection of children from tuberculosis.

THE NEW ENGLAND HEALTH INSTITUTE MEETINGS

DURING the week beginning April 14, 1930, the New England Health Institute conducted clinics at hospitals and sessions at the Hotel Statler which have attracted those interested in public health matters from many places outside of New England. All of the New England States have united in sending many delegates and taking part in the meetings. Medical schools, hospitals, dental and nursing associations, the Institute of Technology and societies devoted to the consideration of specialized public health activities and the United Health Public Health Service all contributed to the program.

Over fifteen hundred persons registered and many of the sessions have been crowded. An especially interesting feature was the interest shown by a large proportion of women which indicates that their growing concern in public affairs may strengthen the efforts of public health officials and perhaps lead to effective legislation along lines hitherto unproductive. Our women friends may have some appeal to the leading law makers to divorce the sometimes apparent relation of politics and public health.

The combination of the banquet and ball with the after-dinner discussions gave opportunity for eminent men to present topics of great interest which made the evening enjoyable from different angles.

Dr. George H. Bigelow, Chairman of the Executive Committee, presided at the banquet and introduced the speakers in his inimical fashion.

Mr. Leverett Saltonstall, representing his Excellency Governor Allen, was the first speaker and brought the greetings of the Commonwealth to the Institute. He depicted some of the public health problems of his place of residence, explaining the necessity for a fence about one of the reservoirs because of the pollution of water from unrestrained animals. He contrasted the conditions of the present time with those of the early history of the Bay Colony when the noise of musketry in Watertown could be heard in Dorchester whereas now with railroads, automobiles, factories, etc., there is no quiet. Referring to the Public Welfare program of the state he contrasted the per capita expense of $3.42 per inhabitant in Massachusetts with that of $2.39 for New York and $1.29 in Ohio. He referred to the progress Massachusetts had made and is continuing in water and sewage development and spoke hopefully of the extension of requirements for pasteurization of milk. He closed by quoting President Hoover's statements respecting the importance of health.

Dr. C. F. Wilinsky, Deputy Commissioner of Health of Boston, was called upon to represent His Honor Mayor Curley, of whom he said that the Mayor had never played politics with public health but on the other hand had lent the full power of his great influence to all public health measures. Especial details of the Mayor's interest was in the health units given to the city under the George Robert White Fund, the baby clinics along the line of preventive pediatrics, the City Hospital, and medical education.

Dr. Robert B. Greenough, President of the Massachusetts Medical Society, was scheduled to speak but was unable to be present.

Dr. Livingstone Farrand, President of Cornell University, paid tribute to Massachusetts for its forward position in public health work and included the other New England States in his commendation of the progressive attitude of New England as a whole and he felt that the rest of the country is following in the paths blazed in this section.

Especial influence was placed on education of the people if endorsement of the leading workers in public health is to be secured because matters left to an uneducated public are apt to be disappointing and safety lies in putting responsibility on the shoulders of public officials. He felt that too little time and money are spent in research in this country for with the acquisition of facts there will be a response by educated people and when convinced of the need they will raise money to meet the price of health.

Dr. Herman Bundesen former Health Commissioner and now coroner of Chicago related in a graphic manner the triumph of the health department of Chicago in dealing with the milk question. Even though there was a law enacted by the legislature prohibiting the tuberculin testing of cattle, with a penalty of fine or jail sentence of anyone convicted, the health department ignored the law over the prediction that the elimination of milk from tuberculosis infected cattle would ruin the farmers of the State, raise the cost of milk from fourteen cents per quart to prohibitive figures and children would die for want of milk and went ahead under an

ordinance of the department. A survey showed that 87% of the cattle producing 11,000,000 quarts of milk were infected with tuberculosis, but acting under the ordinance, tuberculosis was practically eliminated and an adequate supply of pasteurized milk from tuberculin tested cattle is now delivered to the people of Chicago at the former price of fourteen cents per quart and the farmers have not been ruined. No one has been punished and the opponents of tuberculin testing have been converted and endorse this procedure. Founded on the demonstration in Chicago Dr. Bundesen felt hopeful that the time will come when all milk for human consumption will be from tuberculin tested cattle and pasteurized. He scored Massachusetts for its relative indifference to this important health requirement.

Dr. Hugh S. Cumming, Surgeon General of the United States Public Health Service and President Elect of the American Public Health Association, was the next speaker. He told of the decision of the American Public Health Association at its last meeting to have a medal made and given to the most distinguished Public Health Official in this country in memory of the late Professor William Thompson Sedgwick who was one of the foremost scientists in public health work of his time, and after careful deliberation it was decided that the most worthy recipient of this honor is in the person of Dr. Chapin of Providence. He explained the difficulties encountered by Dr. Chapin because during the early period of his work there were no public health schools. However his education in its early stage was acquired largely in the school of experience, through use of his powers of observation and reasoning on which he built methods of procedure which became recognized as sound, although sometimes accepted by others only after opposition founded on distrust had been cleared away.

As the medal was handed to Dr. Chapin the audience rose and paid hearty tribute to this eminent authority in public health work.

Dr. Chapin gracefully replied in the modest and unassuming manner characteristic of the true scientist and incidentally gave to his associates of former years credit for much of the success which came to him.

Dr. Bigelow then closed the after-dinner speaking and invited all to stay and enjoy the ball.

We append a communication from a Correspondent.

Cross-Section of the Recent Health Institute

Aside from the importance of its health and medical presentations the New England Health Institute, that has been recently held in Boston merits good words. Those familiar with the details of such a convention know something of the administrative work necessary, but the "man on the street" has little conception of what others have undertaken in order to give him his meetings. There has been involved coördinated movements reaching back practically to the Institute of last year at Hartford, which was splendid in its success and set before the Massachusetts authorities no mean problem merely to equal it.

The recent Institute, occupying most of the mezzanine floor of the Hotel Statler, had a registration of some 2,000, which in itself was an achievement, and is testimony of the interest of the army of men and women seriously applying themselves to health work. No less than 110 papers were presented, each with a principal speaker and one or more to discuss it, in addition to which were five luncheons or banquets not including sectional ones like that of Connecticut, with speaking at all of them.

There were twenty divisions of health science represented, each one of which having six or more papers presented, there being a number of joint sessions in which two or three, and in one instance four of the sections discussed together the same topic. At all of the sessions the attendance was gratifying, ranging from 300 to 400 in the ball room to fifty or sixty in the smaller parlors. While there was a little instability in the audiences the great majority remained till the final word. Some exercises drew more than had been expected in auditors, but thanks to a most excellent hotel service, larger halls were placed at the service of the Institute in the twinkling of an eye. A paper or two proved so attractive that a repetition was demanded, and even with the crowded program, requiring as many as six halls at the same time, the Aladdin of the Statler merely rubbed his lamp, and genii with truck loads of chairs proceeded with the equipment of some spare space for the extra demand. Then at the close of the papers, in the interval that the time-table allowed for transit, the hallways were filled with the health students, who made these interludes a time for the exchange of greetings and experiences. This was a most valuable feature, for there is high value in the personal contacts that such a convention affords.

Then there were the clinics, to which those working in the special divisions were invited. There were more than thirty of them at twenty different institutions, an exposition of the resources of Boston in this line, and a couple of hundred physicians, not attending morning meetings at the Statler, were added to the registration.

Of course the Health Commissioner of Massachusetts was the active centre of administration in the matter, but he must have had an efficient staff in his executive committee, and to Miss Mildred E. Kennedy, secretary of this group, belongs much of the credit for the smooth operation of the machinery. The rooms were con-

venient, and for each one there was a hostess, who attended to the hall under her charge. If it happened that an interesting discussion threatened to cut into the time reservation of the next occupants, she warned those in charge. Between times she saw that there was a change of air in the hall, kept a watchful eye over proceedings, saw to it that late comers made their entry in such manner as to avoid annoyance to the assembled company, and in case of any needs, such for example, when a room was overflowing with prospective hearers, reported at headquarters and secured other quarters. And this essential service was performed as if the hostesses had had long training.

Then there was a press service such as very few conventions other than political ones, usually secure. Manifolds were ready in advance, men of interest to the newspapers were paged and found, the press was informed as to the important presentations of the day, and the clippings returned were most satisfactory. The information of the public was made as complete as possible. And then there were radio broadcasts every day by notable health administration authorities. And the registration, with half-a-dozen active-minded young ladies at the desks, proceeded smoothly and without sensible delay. An information booth, attended by well-informed ladies served as an especial convenience to those from out of town.

As a convention the Health Institute was notable for the absence of the commercial world that so often dominates great gatherings, two concerns only and both primarily beneficial to health, being permitted to display their wares. It was exceptional in the smoothness of its administration, and leaves a notable example of the standard for future meetings of the kind.

THIS WEEK'S ISSUE

CONTAINS articles by the following named authors:

HODGKINS, EDWARD M. M.D. Tufts College Medical School 1915. F.A.C.S. Assistant Professor of Surgery, Tufts College Medical School. His subject is: "The Use of Fascial Strips in the Repair of Recurrent Inguinal Hernia". Page 797. Address: 12 Bay State Road, Boston.

SMITH, RICHARD M. A.B., Sc.D., M.D. Harvard 1907. Assistant Professor of Child Hygiene, Harvard Faculty of Medicine and School of Public Health. Associate Physician, Children's Hospital. Visiting Physician, Infants' Hospital. Address: 66 Commonwealth Avenue, Boston. Associated with him is:

GALLUP, HENRY E. Ph.B., M.D. Harvard 1926. Assistant in Pediatrics, Harvard Medical School. Assistant Director, Out-Patient Department, Children's Hospital. Address: 66 Commonwealth Avenue, Boston. Their subject is: "Constipation in Children. A Note on the Treatment by Use of a Residue-Free Diet". Page 802.

COLBY, FLETCHER H. B.S., M.D. Harvard 1918. Assistant Urologist, Massachusetts General Hospital. Assistant in Surgery, Harvard Medical School. Surgeon to Out-Patients, Palmer Memorial Hospital. Assistant Surgeon, Collis P. Huntington Memorial Hospital. His subject is: "Bladder Symptoms from Diverticulitis of the Sigmoid". Page 805. Address: 6 Commonwealth Avenue, Boston.

HYMAN, ALBERT S. A.B., M.D. Harvard 1918. Associate Attending Physician and Cardiologist, Beth David Hospital, New York. Director, Witkin Foundation for the Study and Prevention of Heart Disease. Consulting Cardiologist, Harlem Day Nursery. Chief, Cardiac Clinics, Beth David Dispensary. His subject is: "A Pump Test for Functional Reserve of the Heart. A Combined Cardiodynamometer and Accessory Blood Pressure Air Tank". Page 807. Address: 1235 Park Avenue, New York, N. Y.

DUGGAN, D. JOSEPH. A.B., M.D. Harvard 1923. Assistant to Visiting Surgeons, Boston City Hospital. Assistant in Surgery, Harvard Medical School. His subject is: "Chorion Carcinoma". Page 810. Address: 395 Commonwealth Avenue, Boston.

BANCROFT, FREDERIC W. A.B., M.D. Johns Hopkins University 1906. F.A.C.S. Associate Professor of Clinical Surgery, College of Physicians and Surgeons, Columbia University. Surgical Director, Fifth Avenue Hospital. Attending Surgeon, United States Veterans Hospital, Number 81. His subject is: "The Treatment of Cutaneous Burns". Page 811. Address: 1 E. 105th Street, New York, N. Y.

The Massachusetts Medical Society

SECTION OF OBSTETRICS AND GYNECOLOGY

Louis E. Phaneuf, M.D., *Chairman* — Alonzo K. Paine, M.D., *Secretary*

Frederick J. Lynch, M.D., *Clerk*

What is the best plan of treatment for dysmenorrhea?

We recognize two distinct types of dysmenorrheic cases: (1) those in which there is anatomic pathology in the pelvis; and (2) those in which the pelvic organs show no structural abnormality.

(1) The first type of dysmenorrhea is comparatively uncommon in young virgins. On the other hand, it is the more common variety in married women, especially in women who have borne children.

The recognition of this type of case is not difficult, for the symptomatic picture is fairly distinctive. Pain begins well before the onset

of the flow and lasts a day or more. The character of the pain is dull, dragging, and constant. It is felt throughout the lower abdomen, and is often accompanied by backache. The amount of the flow tends to be increased. Intermenstrual pelvic symptoms are common. Pelvic examination reveals whatever lesion may be present; the commonest abnormalities are chronic passive congestion, inflammatory disease, fibromyomata, and fixed retrodisplacements.

The treatment in cases of this sort is the usual treatment of the causative lesion.

(2) Dysmenorrhea of the second type is encountered in about ninety per cent. of virginal cases. It presents the common problem with which academic and industrial organizations have to deal.

The clinical picture here also is characteristic. The pain begins about the time of the onset of the flow, and lasts only a few hours as a rule. However, prostration may continue for a day. The pain is usually intermittent, cramplike, and colicky, though at times it may be of a steady and burning character. It is generally localized in the mid-line over the uterus. The amount of the flow tends to be normal. Intermenstrual pelvic symptoms are absent. Examination in such cases usually reveals normal virginal pelvic organs. It might be noted in passing that anteflexion of the uterus and a so-called "pin-hole" os externum are normal virginal conditions.

In cases of this type we have learned to interpret the dysmenorrhea as a purely functional disturbance, having its origin in a state of nervous instability. The patient may or may not be obviously of a nervous type; the instability is an affair of the autonomic nervous system more than of the cerebrospinal. The poor nervous balance results in faulty and spasmodic uterine function, even though the uterus and its appendages are structurally normal.

Underlying this state of nervous instability, or concomitant with it, are several other conditions. Two of the most important are constipation and poor posture; indeed, these two errors make up, with dysmenorrhea, a characteristic syndrome. Anaemia is occasionally included in the physical picture. An important aspect of these cases is the poor hygiene which is found among patients of the better classes no less often than among the poor.

When a girl presents herself for the treatment of this usual type of virginal dysmenorrhea, one should first carry out a complete physical examination in order to make sure that there are no impediments to good general health. An abdominorectal examination of the pelvis should be made. In most cases this will yield quite satisfactory information about the pelvic organs, which are usually normal. The posture should be carefully noted. A detailed history will reveal any important hygienic errors in the patient's general mode of living.

The first step in treatment is the systematic and thorough correction of whatever faults may have been discovered, with particular reference to constipation, poor posture, and incorrect hygiene. Experience with large groups of girls in colleges has shown that permanent relief of dysmenorrhea is obtained in a majority of cases by no further treatment than this. It is necessary, however, to devote considerable attention to the details of rectifying the above-mentioned faults, and to secure the interest and coöperation of the patient in the project. Merely casual advice about such a thing as chronic constipation, for example, will bring no results whatever. A systematic program must be evolved, with due emphasis laid upon the importance of regular hours, rest, exercise (especially walking), bathing (especially cold showers), and proper clothing. In some cases the patient's mental attitude toward the menstrual function requires readjustment.

It is often useful to give these patients a set of pelvic exercises, of which the benefits probably depend upon a stimulation of the pelvic circulation. The ordinary exercises are three in number. First, lying on the back with the knees drawn up, the patient alternately draws in and pushes out the muscles of the lower abdomen with the utmost possible force, for twenty times at a rate not faster than five times a minute. Second, lying in the same position, she slowly and forcefully contracts the levator ani muscles twenty times, also not faster than five times a minute. Third, she assumes the knee-chest position and maintains it for five minutes, not neglecting to separate the labia majora so that atmospheric pressure may balloon the vagina.

During the first two or three months of the régime which leads ultimately to permanent cure, it is sometimes wise to offer temporary palliation. The benefits of heat are well known, and may be obtained by enemas, hot drinks, sitz baths, or external applications. For palliative purposes the antispasmodics like benzyl benzoate, or the coal-tar analgesics, may be employed. In no case, however, do drugs offer more than month-to-month relief. It is doubtful whether endocrine therapy has any real value in the treatment of this complaint. Endocrine deficiencies, and developmental retardation resulting therefrom, are by no means rare in the adolescent years, but dysmenorrhea is not characteristically a symptom of such conditions.

A small minority of intractable cases will resist the methods thus outlined. For these one must seek special means of treatment, of which several are available. Cures have been obtained by cocainization and cauterization of the nasal mucosa, by psychotherapy, by electrotherapy, and by various other methods. Dilatation of the cervix produces benefit, usually temporary, in a certain number of cases, probably by some ob-

secure readjustment of the nervous balance rather than by removing any hypothetical factor of obstruction. Other surgery is nearly always disappointing in the functional type of dysmenorrhea; in particular, curettage is likely to do far more harm than good. The same may be said of the employment of intrauterine stem pessaries.

Questions of a similar nature to the above will be discussed in the *Journal* each week. They may be addressed to the Clerk of the Committee in care of the *Journal* and will be answered by members of the Committee of the Section of Obstetrics and Gynecology.

THE MEDICAL LIBRARY AND MASSACHUSETTS MEDICAL SOCIETY FUND

If your will has been made would you not like to add a codicil in favor of the Fund, or if you ever make a new will would you not like to insert a provision for a special bequest?

MISCELLANY

ADDRESS BY PRESIDENT HOOVER

Delivered in Memorial Continental Hall, Washington, D. C., at the Ceremonies in Honor of the Eightieth Birthday of Dr. William Henry Welch, April 8, 1930

The many years that I have been honored with Dr. Welch's friendship make it a privilege to join in this day of tribute to him by his friends and by the great scientific societies of our country and of the whole world. Dr. Welch has reached his eightieth year and a whole nation joins in good wishes to him.

Dr. Welch is our greatest statesman in the field of public health, and his public service to the nation well warrants our appreciation of him. With profound knowledge, wide experience and skill in dealing with men, sound judgment and a vision of the future, he has been a great asset to this nation, and we may fortunately hope that he will continue for many years to bless mankind with his invaluable leadership.

Our age is marked by two tendencies, the democratic and the scientific. In Dr. Welch and his work we find an expression of the best in both tendencies. He not only represents the spirit of pure science but constantly sees and seizes opportunities to direct its results into the service of human kind.

Medicine until modern times was a species of dramatic play upon emotions rather than a science made useful through technology. It combined centuries of experience in trial and error in reactions from many drugs, with a maximum of skill on the part of the practitioner in a kindly art of making the patient feel as hopeful and comfortable as possible while he was dying of the disease, the origin and treatment of which was as yet undiscovered. Providence was made responsible for his fate rather than the bacillus which should never have been allowed to infect him.

Modern medical practice, however, is based upon a vast background of scientific research and discovery. In the creation of this science, in the conversion of its principles into technical methods for use in actual practice, in the diffusion of knowledge of these principles and methods, and in the application of them upon a national and world-wide scale, Dr. Welch has played a leading American part. As a research worker in pure science, he has made original and valuable discoveries. As a technologist he has devised practical methods of applying pure science. As a teacher he has spread true knowledge and inspiration among literally thousands and hundreds of thousands. But in organizing and directing research and application of medical knowledge on a wider field of prevention of disease, he is among the preëminent few who deserve the title of statesman.

No valuable change in everyday practice of any of the great arts has ever been made that was not preceded by the accretion of basic truths through ardent and painstaking research. This sequence that precedes effective action in medicine is equally important in every field of progress in the modern world. It is not the method of stirred public emotions, with its drama of headlines; it is rather the quiet, patient, powerful and sure method of nature herself, of which Dr. Welch has been the master.

Dr. Welch has handily combined in his character and intellect the love of truth and the patient experimental habit of the pure scientist, with the ingenuity of the inventor and the organizing vision and energy of the promoter of sound enterprise—and combines all these things with a worldly wisdom and gracious charm that has made him a leader amongst men.

When we have said all of these things in tribute to his scientific knowledge, his great influence in education and public health, we have one more thing we may say that transcends them all. That is, that he has contributed more than any other American in the relief of suffering and pain in our generation and for all generations to come.

I know that I express the affection of our countrymen and the esteem of his profession in every country when I convey to him their wishes for many years of continued happiness.

THE APPOINTMENT OF DR. WINFRED OVERHOLSER

Dr. George M. Kline, Commissioner of Mental Diseases for Massachusetts, has appointed Dr. Winfred Overholser as Assistant Commissioner. This appointment has been confirmed by the Governor and Council.

The position was made vacant by the appointment of Dr. T. A. Hoch, former Assistant Commissioner, to the position of Superintendent of the Northampton State Hospital for the Insane.

Dr. Overholser is a graduate of the Boston University Medical School in the class of 1916. He served as resident physician at the Evans Memorial Hospital and later was a member of the Staff at the Westboro State Hospital. He was given the rank of lieutenant in the World War serving in the neuropsychiatric section of the United States Army Medical Corps. After leaving the service at the Westboro Hospital he was

appointed as Assistant Superintendent at the Gardner State Colony and later Assistant Superintendent at the Medfield State Hospital. In 1924 he became Assistant Commissioner in the State Department of Mental Diseases and in 1925 was made Director of the Division for the Examination of Prisoners in State Institutions.

He is Assistant Professor of Psychiatry at the Boston University School of Medicine. In all of these positions he has been recognized as an authority and has shown executive and technical ability.

A MOTHER OF THREE READS OSLER'S AEQUANIMITAS

MARIE HERSEY FORBES

Great teacher and physician who inspired
The searchings that protect my little folks,
With rocking of the cradle I have sought
The farewell blessings of your lifted hands,
Not meant for simple laymen like myself,
Forgotten Cicero came to my aid—
Remembered Tennyson let in some light,
And I have gleaned some equanimity.

Should jazz have reached your ears on the dark shore,
I'm not a dancing mother—see my shoes
Low heeled and plain, the kind that nurses wear
At least while they are very new recruits.
And many a night beside a croupy child
I've kept the benzoin steaming hour on hour.
I am outside—I wear no uniform
And I can lay no record at your feet
Of cats cut up or microbes magnified
And the essential, youth, your requisite
Is gone: The wreath I bring has one grey hair.
Had you an aunt in a black walnut frame
Memorialized in flowers of human hair?
The garland that I bring is no dead stuff
And through it all, alive, runs this grey truth:
A woman not too old for ten more babies
Might be too old to learn to pass out pills.
But neither time nor tide can stop a poet:
In the dim amphitheater where you stand
Till all have stepped down front for their diplomas
Accredited to battle death if need be,
Look once with kindness and speak not all Latin
To a shy ghost who worships you afar
The cradle folded, ipecac outgrown,
Who is your bard forever and forever.

MEASLES AND SMALLPOX

Measles and smallpox were the only two communicable diseases which showed an increase throughout the country the week beginning March 31 over the same period the year before, according to the weekly bulletin of the U. S. Public Health Service issued April 11.

WEEKLY HEALTH INDEX

Telegraphic returns from 65 cities with a total population of thirty million for the week ending April 12, indicate a mortality rate of 14.2 as against a rate of 13.4 for the corresponding week of last year. The highest rate (22.0) appears for New Orleans, La., and the lowest (7.8) for New Haven, Conn. The highest infant mortality rate (163) appears for Somerville, Mass., and the lowest for Kansas City, Kansas, and Schenectady, N. Y., which reported no infant mortality.

The annual rate for 65 cities is 13.9 for the fifteen weeks of 1930, as against a rate of 15.9 for the corresponding weeks of 1929.

COST OF MEDICAL CARE

Seventy dollars per family was the average cost of medical care during a recent six-months period for over 3,000 workingmen's families selected for study from the insured list of the Metropolitan Life Insurance Company. The total expenditure for these families during this period was $230,907. The expenditures for the larger families averaged less per capita than for the smaller families, and one-fifth of the families expended nearly two-thirds of the total. —*U. S. Department of Labor Children's Bureau.*

RECOMMENDATIONS RELATING TO PUBLIC HEALTH

In a report recently submitted to Congress, Surgeon General H. S. Cumming of the Public Health Service calls attention to the fact that the protection and promotion of the public health are of great importance to the nation. It is stated that this is true from several aspects, among the more obvious of which may be mentioned: efficiency, economy, and national security. It is, therefore, necessary to recommend from time to time additional measures not only to prevent the introduction and spread of diseases, but to conduct studies relating to their cause, means of spread and methods of prevention. Studies of public health problems are becoming increasingly complex.

The highly specialized professional personnel of the Public Health Service is segregated into a compact unit for administrative purposes and is so organized that it can be drawn on for expert help whenever it is needed in any other branch of the Government. This plan of organization involves a minimum of expense and insures uniformity and accuracy of method. The further development of this system would place at the command of the Government one source from which each requirement for such services could draw and would obviate the building up of new professional units in the various Departments at large over-head expense and with inevitable duplication of work and lack of coördination.

It is important from the health standpoint for this policy to be extended so as to apply to all agencies of the Government not specially provided with medical and sanitary services. The need to strengthen the health activities of the Government and to bring about their proper correlation has long been recognized. In order to insure the orderly development of Federal health work and to prevent waste authority to this end should be established by law.

A number of studies which come within the scope of field investigations of public health could be profitably developed. It is felt that the expansion of the cancer research program would be of decided advantage. Investigations relating to industrial hygiene,

including air pollution and its effect upon health, should be extended. More intensive studies of mental diseases from the standpoint of biochemistry and endocrinology should be undertaken. Studies of heart disease, which is one of the major causes of premature death, should be instituted. Investigations relating to undulant fever, including its epidemiology and prevention, should be increased. Research on several child hygiene problems is urgently needed. To meet the constant increase in population and the growth of industry, enlargement should be made of the studies of stream pollution now being conducted. Provision for increased facilities at the Hygienic Laboratory is recommended to provide for additional studies of important problems relating to public health.

The plan of applying practical public health knowledge to the people of rural sections through the development of efficient whole-time county health departments is receiving wider interest and attention as its benefits and advantages become more generally recognized.

There is no doubt that such local health organizations provide the machinery through which all public health activities may be conducted in proper sequence and relation one to the other, thereby insuring to communities a well-balanced, comprehensive and general program of public health work well adapted to their needs. These health departments in doing their work also perform service of statewide and nation-wide importance in the prevention of intrastate and interstate spread of disease.

In view of the proved effectiveness and practicability of coöperative rural health work between national, state and local health agencies it is recommended that favorable consideration be given to some form of general legislation that would place the rural health work of the Government upon a definitely coöperative basis and provide for appropriations in proportion to the needs and importance of such work.—*United States Public Health Service.*

RECENT DEATH

SHERMAN — Dr. Mary Hastings Sherman of Brookfield died of a septic sore throat at Belmont Hospital, Worcester, April 15, 1930, aged 61.

A native of Brookfield she was the daughter of the late Levi and Lucy Aspinwall Sherman. After graduating at the Brookfield high school she entered the Woman's Medical College of Pennsylvania, where she received her M.D. in 1891. She served one year as interne at the Philadelphia General Hospital and another at the Episcopal Home for Consumptives at Chestnut Hill, Philadelphia. Settling in her native town, she joined the Massachusetts Medical Society in 1894, served on the Brookfield board of health, was chairman of the finance commission of the Red Cross, was first president of the village improvement society and was secretary of the Brookfield Medical Club from its organization 20 years ago. She held fellowship in the American Medical Association, in the National Woman's Medical Association and in the Brookfield Grange.

OBITUARY

DR. P. SOMERS SMYTH

Dr. P. Somers Smyth, one of this country's most prominent oculists, died at the Phillips House of cerebral embolism October 28, 1929 after an illness of but three days. He was born in Port Hood, Nova Scotia, October 26, 1877, and was the son of Christopher Smyth and Ellen Somers Smyth, and grandson of the Hon. Peter Smyth, one time member of the Provincial Parliament at Halifax. The late Dr. John E. Somers, a prominent Cambridge surgeon, was his uncle, and Dr. D. Campbell Smyth of Boston, widely known for his work in bronchoscopy, is his brother. He married Irene Kennedy, daughter of D. T. Kennedy of Haverhill and Boston, on June 25, 1913, and one daughter, Noel, was born to them on Christmas day, 1917.

He attended St. Francis Xavier College and received the degree of B.A. in 1896, after which he entered the teaching profession. He was principal of Port Hood Academy for three years, and then took up the study of medicine, graduating from Harvard Medical School in 1904 with a *cum laude*. He decided to specialize in ophthalmology, and served as interne at the Massachusetts Eye and Ear Infirmary, of which institution he later served several years as Assistant Surgeon. He was later Surgeon in Chief of ophthalmology at Carney Hospital for some years, giving up both of these positions a few years ago in order to devote his entire time to his private practice, retaining only positions as Consulting Surgeon at several hospitals in or near Boston.

He began practice in Boston in 1906. About the same time a rather remarkable group of men started in practice, with several of whom Dr. Smyth was closely associated, both professionally and socially. The group included, among others, Dr. George Loring Tobey, Jr., in ear, nose and throat work; Dr. Frank Howard Lahey, general surgery; Dr. Wm. Russell MacAusland, orthopedic surgery; and Dr. Harry W. Goodall, internal medicine. All of these men became leaders in their respective lines. Dr. Smyth with his fine training, keen, analytical mind, and pleasing personality, very soon became prominent in his profession, and speedily built up a large private practice.

Although engaged in the practice of a rather restricted specialty, he never lost his interest in the problems of general medicine. He was one of the first, if not the first oculist in Boston to realize the importance of focal infections as etiological factors in various toxic and infectious eye conditions, and early applied this knowledge in his practice, with gratifying results. It is unfortunate that he did not write more along these lines, but he often said that he was too busy to write. Owing to ill health for several years before his death, his activities were limited to his private work.

Dr. Smyth was as popular socially as he was prominent professionally. He had travelled much and read widely, and with his quick wit and fine sense of humor, he was a charming host or welcome guest. Unfortunately he declined all social activities in his last few years, as he insisted on expending all his

energy on his professional work. He was stricken in his office on Friday, October 25, and died the following Monday, working right up to the time when he took to his death bed. He had often expressed a wish that his end would come in this way.

He was a member of the New England Ophthalmological Society, and several other medical and scientific societies; also of the Algonquin and Harvard Clubs of Boston, Tedesco, Braeburn and Baldpate Country Clubs, and the Everglades Club of Palm Beach, Florida. Dr. Smyth was ambitious, energetic in his profession, and a staunch and loyal friend.

WILLIAM E. PREBLE, M.D.

NEWS ITEMS

DR. E. M. HODGKINS WILL ADDRESS THE STAFF OF THE BROCKTON CITY HOSPITAL—Dr. Edward M. Hodgkins, assistant professor of surgery at Tufts Medical School, and a graduate of that institution with the class of 1915, will read a paper before the staff of the Brockton City Hospital, Brockton, Mass., on May 6.

Dr. Hodgkins' subject will be Recurrent Inguinal Hernia, and he will give a lantern slide demonstration of his own original operation in connection with his lecture.

AN INCREASE IN THE NUMBER OF HEALTH EXAMINATIONS—A twenty-five per cent. increase in the demands for Health Examinations since October 15, 1929, when the Five County Medical Societies of Greater New York launched the Periodic Health Examination Campaign, has been reported by the physicians of Greater New York.

DR. S. R. MEAKER ADDRESSED THE CINCINNATI COMMITTEE ON MATERNAL HEALTH—On April 21 Dr. Samuel R. Meaker, Associate Professor of Gynaecology at the Boston University School of Medicine, addressed a luncheon meeting of the Cincinnati Committee on Maternal Health and an evening meeting on the Cincinnati Academy of Medicine.

NOTICES

UNITED STATES CIVIL SERVICE EXAMINATIONS

Medical Officer
Associate Medical Officer
Assistant Medical Officer

Applications will be rated as received by the U. S. Civil Service Commission at Washington, D. C., until June 30, 1930.

The United States Civil Service Commission announces open competitive examinations under the above titles for filling vacancies occurring in the Federal classified civil service throughout the United States, unless it is found in the interest of the service to fill any vacancy by reinstatement, transfer, or promotion.

Salary and promotion, Departmental Service—The entrance salaries for these positions in the Departmental Service, Washington, D. C., are: Associate Medical Officer, $3,200 a year; and Assistant Medical Officer, $2,600 a year. A probationary period of six months is required; advancement after that depends upon individual efficiency, increased usefulness, and the occurrence of vacancies in higher positions.

Applications—Application blanks (Forms 2600 and 2398), which are required, may be secured from the following (the title of the examination desired should be stated): U. S. Civil Service Commission, Washington, D. C.; the Secretary of the U. S. Civil Service Board, Customhouse, Boston, Mass., New York, N. Y., New Orleans, La.; Post Office, Philadelphia, Pa., Atlanta, Ga., Cincinnati, Ohio, Chicago, Ill., St. Paul, Minn., Seattle, Wash., San Francisco, Calif., Denver, Colo.; Old Customhouse, St. Louis, Mo.; Federal Building, Honolulu, Hawaii; Administration Building, Balboa Heights, Canal Zone; or the Chairman of the Porto Rican Civil Service Commission, San Juan, P. R.

The United States Civil Service Commission announces the following open competitive examination:

Associate Pharmacologist

Applications for associate pharmacologist must be on file with the Civil Service Commission at Washington, D. C., not later than May 21, 1930.

The examination is to fill a vacancy in the Hygienic Laboratory, Public Health Service, Washington, D. C., and vacancies occurring in positions requiring similar qualifications.

The entrance salary is $3,200 a year. Higher-salaried positions are filled through promotion.

Full information may be obtained from the United States Civil Service Commission at Washington, D. C., or the Secretary of the United States Civil Board of Examiners at the post office or customhouse in any city.

PITFALLS IN COLLECTION OF ACCOUNTS

Our attention has been called to an article in the *Journal of the American Medical Association* of April 5 setting forth the dangers and pitfalls incident to employing collection agencies. It is a matter of history that collection agencies have not always been reliable and on the other hand have made undue charges against those for whom they have assumed responsibility for the collection of bills. Hence a great deal of uncertainty has existed with reference to some of the collection agencies. It behooves physicians to investigate carefully any organization or person who solicits work of this kind.

UNIVERSITY OF MINNESOTA WILL CONDUCT A SYMPOSIUM ON THE KIDNEY IN HEALTH AND DISEASE

These exercises will be held at the University of Minnesota Medical School, Minneapolis, Minnesota, July 7-18, 1930.

The University asks all those who attend this sym-

posium to register. There will be no registration fee.

The University will try to provide dormitory accommodations at a reasonable price during the symposium if registration is made before June 1.

Hotel accommodations will be arranged for if registration is made before the opening of the symposium.

All correspondence in regard to the symposium may be addressed to the Symposium, University Hospital, Minneapolis, Minnesota or direct to Dr. Hilding Berglund, University Hospital, Minneapolis, Minnesota.

The final program, including a brief synopsis of each lecture, will be issued before June 1.

REPORT AND NOTICE OF MEETINGS

THE HARVARD MEDICAL SOCIETY

A meeting of the Harvard Medical Society was held at the Peter Bent Brigham Hospital Amphitheatre on Tuesday, April 8, 1930 at 8:15 o'clock. After the presentation of cases Dr. Cecil Drinker introduced Dr. Peyton Rous, Member of the Rockefeller Institute for Medical Research, who spoke on "The Gradient of Vascular Permeability".

Dr. Cochran presented the surgical case. The patient was a 30 year old Russian Jewish chauffeur who entered the hospital one day before with a diagnosis of an "acute abdomen". His past history was negative in relation to his present condition. Three months ago he began to have anorexia and insomnia, with weakness and a rapid loss in weight. Three weeks ago he was sent to a sanatorium for nervous diseases where he was kept in bed, given a high caloric diet, sunshine, and ultraviolet therapy. Nine days before admission he had unexplained nausea followed by three loose bowel movements not abnormal in appearance. He developed pain in the hypogastrium relieved somewhat by enemata. He never had a cough, hemoptysis, sweats, chills, or fever. Physical examination showed an ill man with a flushed and sweating face. His face was pigmented, supraclavicular fossae sunken, increase of breath sounds over right upper lung lobe, no râles, small heart, blood pressure 84/44, abdomen scaphoid with no tenderness, masses, or spasm. The extremities were wasted. X-ray films of the chest showed extensive bilateral pulmonary tuberculosis. Though there was some question as to the diagnosis, it was thought that the patient probably had tuberculous peritonitis and adrenal tuberculosis in addition to his lung condition.

The second case was presented by Dr. Bowie. The patient was a 58 year old American widow who came to the hospital complaining of attacks of unconsciousness of one year's duration. For five years she had been having attacks of faintness dizziness, morning nausea, and vomiting, relieved by malted milk. These attacks had no time relation to anything. In June, 1927, she came to the O. P. D. where x-rays of the skull showed a slight irregularity in the fronto-parietal region, but which disappeared in subsequent pictures. She entered the hospital in March 1928, where she had two attacks in both of which the only pathology found was a low blood sugar. She was discharged on a diet and remained a year almost free of attacks. In March 1929, she had a fainting spell in which she broke her leg. While she was in the hospital she had no spells. She then began to have very severe attacks and finally entered the hospital. Physical examination was negative except for slight tenderness around the umbilicus. Clinical pathology was negative except for the low blood sugar. A 24 hour curve showed it to be consistently low. Investigations are being carried on as to the effects of adrenalin, atropin, and belladonna on the blood sugar. Dr. Weiss suggested the patient may have an adenoma of the pancreas causing hyperinsulinemia.

Dr. Rous in his paper pointed out the extreme practical value it would be if we could know why certain substances filter through to the tissue spaces and others not. His studies were made with the so-called ester dyes which have no chemical affinities and are not toxic to the body tissues. These dyes can be made of a highly diffusible or almost non-diffusible type. It cannot be foretold by their molecular weights what certain dyes will do in the body because some of them change their weight in the body.

If a dye is injected into an animal, it first becomes intensified at the venule and extends back one third of the way to the arteriole, that is, the distal third of the capillary. The subsequent staining, which does not become general for 3-4 hours, takes place by a gradual filling in of the interspaces. If the diffusion is checked immediately after injection of the dye, one sees a diffuse staining everywhere, but superimposed upon it a greater staining on the other half of the capillary. With some of the dyes which give the most intensive stain, little tufted appearances of dye are seen where the capillaries enter the venules. If the animal is bled to the limit and a dye injected, it is found to diffuse most rapidly through the venous end of the capillary. This grading of permeability is not varied by producing pleasure in the animal, getting him nervous, exercising him, or anaesthetizing him.

Dr. Rous concluded that evidently there is a grade of distribution for these dyes since they come out easiest from the further part of the capillary and easier the further along the capillary they go. All the findings made him feel that the gradient cannot be attendant upon functional conditions, but must be inherent in structure.

THE FOURTH PUBLIC HEALTH INSTITUTE

For Health Officers and Other Public Health Workers

At the Massachusetts Institute of Technology, Cambridge, Massachusetts, June 23 to July 12, 1930

Conducted by the Department of Biology and Pub-

lic Health of the Massachusetts Institute of Technology, with the coöperation of the Metropolitan Life Insurance Company.

The Massachusetts Association of Boards of Health has assisted in the planning of this program through a committee consisting of Doctors F. G. Curtis, F. P. Denny and V. A. Safford.

This Institute aims to provide for the health officer or other qualified public health worker an opportunity to study public health procedures and to examine modern public health practices under the direction of experts in the respective fields.

Medical practitioners frequently find it useful to spend brief periods in observation and study at great clinical centers. The Public Health Institute hopes to provide an equally valuable type of experience for health officers, public health nurses, and others actively engaged or interested in public health work. It will have as its main purpose, intensive instruction in the essential principles and the presentation of the best methods of modern practice in some of the important aspects of public health work.

Meetings will be held six days a week for three weeks. The time will be devoted to lectures and round table discussions or conferences on the subject matter under consideration, with numerous laboratory or clinical demonstrations or field trips.

Since the aim of the work is to assist in promoting scientific public health practice in this country, a nominal fee of only $40 will be charged. A limited number of awards of free tuition will be made in exceptional cases. For attendance for less than three weeks, a charge of $2.50 per day will be made.

Certificates of attendance will be given upon request.

REGISTRATION

Application for this work should be addressed to the Registrar, Massachusetts Institute of Technology, and if possible, such application should be made by June 15. Registration forms will be sent to each applicant, and these blanks may be returned by mail or may be presented on the first day of the session. Fees are payable in advance to H. S. Ford, Bursar.

For further information regarding the Public Health Institute, address Professor S. C. Prescott, Department of Biology and Public Health, Massachusetts Institute of Technology, Cambridge, Mass.

General Program

Monday, June 23

9.00 A. M.
Registration, if not previously completed by mail.

9.30 A. M.
The Plan and Purpose of the Public Health Institute. Professor S. C. Prescott, Sc.D., Head of the Department of Biology and Public Health, Massachusetts Institute of Technology.

Brief addresses are expected from
Dr. G. H. Bigelow, Commissioner of Health of Massachusetts.
Dr. F. X. Mahoney, Health Commissioner of Boston.
Dr. F. G. Curtis, Massachusetts Association of Boards of Health.

11.00 A. M.
The Examination of Milk Supplies—Standard and Other Methods.
Professor Prescott.

P. M. Demonstrations and Discussion.

Tuesday, June 24

A. M. The Administrative Control of Milk Supplies.
Professor Prescott.

P. M. Field Trip to Observe Farm Inspection and Pasteurization.

Wednesday, June 25

A. M. The Examination of Drinking Water.
Professor Prescott.
M. P. Horwood, Ph.D., Assistant Professor of Biology and Public Health, Massachusetts Institute of Technology.

P. M. Water Supplies—Purification.
Professor Horwood.
Mr. R. S. Weston, A.M., C.E., Consulting Sanitary Engineer, Boston.
Inspection of Cambridge Filtration Plant.

Thursday, June 26

A. M. Trip to Lawrence Sewage Experiment Station.

P. M. Aerobic Methods of Sewage Disposal.
Professor Horwood.

Friday, June 27

A. M. Anaerobic Methods of Sewage Disposal.
Professor Horwood.

P. M. Garbage Disposal.
Professor Horwood.

Saturday, June 28

A. M. Nutrition, Its Significance and Recent Developments.
Miss E. C. Nickerson, Director of Nutrition, State Department of Health, Hartford, Conn.
The Dental Health Program.
Dr. Percy Howe, Professor Dental Research, Harvard Medical School.

P. M. Public Health Law.
Dr. James A. Tobey, Director of Research, Borden Sales Company, New York, N. Y.

Monday, June 30

A. M. Rural Sanitation.
Dr. C. F. Kendall, Commissioner, State Department of Health, Augusta, Maine.
Animal Diseases in Relation to Man. I.

P. M. Animal Diseases in Relation to Man. II.
Dr. V. A. Moore (formerly Dean, New York State Veterinary College, Ithaca, N. Y.), Superintendent, Ithaca Memorial Hospital.

Tuesday, July 1

A. M. Health Centers—Pre-School Clinics.
Dr. C. F. Wilinsky, Superintendent, Beth Israel Hospital, Boston.
Visit to Health Center.
Public Health Nursing.
Miss Hazel Wedgwood, R.N., Director of Public Health Nursing, Boston Health Department.
P. M. School Health Administration.
Dr. J. A. Ceconi, Director of School Hygiene, City of Boston.

Wednesday, July 2

A. M. Sanitary Inspection—Slaughterhouses, Markets, Restaurants.
Dr. P. H. Mullowney, Director of Food Inspection, Boston Board of Health.
P. M. Public Health Education and Publicity.
Mr. B. R. Rickards, S.B., Director of Publicity, New York State Department of Health.

Thursday, July 3

A. M. Vital Statistics.
Carl Doering, Ph.D., Department of Vital Statistics, Harvard School of Public Health.
Professor Horwood.
P. M. Public Health Surveys.
Professor Horwood.
Appraisal Forms and Budgets.
Dr. W. F. Walker, American Public Health Association.

Saturday, July 5

A. M. Health Department Organization, etc. (At Worcester.)
Dr. T. F. Kenney, Health Officer, Worcester.
P. M. Visit to Worcester Sewage Disposal Plant, under direction of Professor Horwood.

Monday, July 7

A. M. Diphtheria Control—Cultures and Laboratory Examinations, Administrative Procedure.
Dr. F. H. Slack, Assistant Professor of Public Health Laboratory Methods, Massachusetts Institute of Technology.
P. M. Diphtheria Prevention, Schick Testing, Toxin-Antitoxin.
Dr. Ceconi.

Tuesday, July 8

A. M. Scarlet Fever Prevention, etc., Dick Test.
Dr. E. H. Place, Director, South Department, Boston City Hospital.
P. M. Smallpox Control, etc.
Benjamin White, Ph.D., Director, State Antitoxin Laboratory, Forest Hills.

Wednesday, July 9

A. M. Tuberculosis.
Dr. A. S. Pope, Epidemiologist, Massachusetts State Department of Health.
Visit to West Concord Street Clinic.
P. M. Tuberculosis Control.
Dr. D. B. Armstrong, Metropolitan Life Insurance Company, New York City.

Thursday, July 10

A. M. Typhoid, etc.
Dr. Slack.
P.M. Pneumonia.
Dr. F. T. Lord, Massachusetts General Hospital.

Friday, July 11

A. M. Poliomyelitis, Influenza, Venereal Diseases.
Dr. G. H. Bigelow, Commissioner of Health of Massachusetts.
Dr. W. E. Aycock or Dr. S. D. Kramer, Harvard Poliomyelitis Commission.
Dr. H. L. Lombard, Massachusetts State Department of Health.
Dr. Nels C. Nelson, Massachusetts State Department of Health.
P. M. Epidemiological Methods.
Dr. C. L. Scamman, Deputy Commissioner of Health of Massachusetts.

Saturday, July 12

A.M. Retrospect and Prospect in Public Health.
Dr. P. H. Bryce, Ottawa, Ont.

Arrangements can be made for visits to sanatoria, laboratories of plants, etc., on July 14 and 15, if desired.

SOCIETY MEETINGS, CONGRESSES AND CONFERENCES

1929-1930—Massachusetts Dietetic Association. Complete schedule appears on page 852, issue of October 24, 1929.

March-October — International Medical Postgraduate Courses in Berlin. Complete notice appears on page 853, issue of October 24, 1929.

April 24—The Clinical Conference of the New England Hospital for Women and Children. Detailed notice appears on page 791, issue of April 17.

April 26—Boston City Hospital Alumni Association. Detailed notice appears on page 791, issue of April 17.

April 30—New England Obstetrical and Gynecological Society. Complete notice appears on page 745, issue of April 10.

May 2—Annual Meeting of the American Society of Stomatologists. Detailed notice appears on page 92, issue of January 9.

May 5-10—First International Congress on Mental Hygiene. Detailed notice appears on page 93, issue of January 9.

May 8—Clinical and Surgical Association of Massachusetts. Complete notice appears on page 745, issue of April 10.

June 23-July 12—The Fourth Public Health Institute. Complete notice appears on page 839.

September 4-8—Fifth International Congress on Physiotherapy. Complete notice appears on page 906, issue of October 31, 1929.

October 27—The American Public Health Association. Detailed notice appears on page 1271, issue of December 19, 1929.

March 23-27, 1931—Fifteenth annual clinical session of the American College of Physicians. Detailed notice appears on page 790, issue of April 17.

DISTRICT MEDICAL SOCIETIES

Essex North District Medical Society

May 1—Thursday—Censors' meeting at Hotel Bartlett, 95 Main Street, Haverhill, (Telephone 3430) at 2 P. M. sharp. Candidates should present their diplomas to the Secretary one week in advance.

May 14—Wednesday—Annual Meeting, at Anna Jaques Hospital, Highland Avenue, Newburyport, Mass., at 12 noon. Subject, "Infective Foci: Sense or Nonsence".

There will be talks and discussions on the subject from individual points of view, by seven physicians engaged in nine of the specialties of medicine, and from the dental standpoint.

J. FORREST BURNHAM, M.D., Secretary.

Essex South District Medical Society

Thursday, May 1, 1930—Censors meet for Examination of Candidates at Salem Hospital at 3:30 P. M.

Tuesday, May 13, 1930—Annual Meeting. The Tavern, Gloucester. Speaker: Dr. C. Macfie Campbell, Director of Boston Psychopathic Hospital. Subject to be announced later. Ladies invited. Dancing.

R. E. STONE, M.D., Secretary.

Franklin District Medical Society

The next meeting of the Franklin District Medical Society will be held at the Weldon Hotel, Greenfield, Mass., on the second Tuesday of May, at 11 A. M.

CHARLES MOLINE, M.D., Secretary.

Hampden District Medical Society

April 29—Detailed notice of meeting appears on page 791, issue of April 17.

H. L. SMITH, M.D., Secretary.

Hampshire District Medical Society

The Annual Meeting will be held May 7. Complete notice appears on page 792, issue of April 17.

LUTHER O. WHITMAN, M.D., Secretary.

Middlesex East District Medical Society

May 13—At Unicorn Country Club, Stoneham.

ALLAN R. CUNNINGHAM, M.D., Secretary.

Middlesex South District Medical Society

May 1, 1930—Censors' meeting. Medical Library, Boston, at 2 P. M.

ALEXANDER A. LEVI, M.D., Secretary.

Norfolk District Medical Society

May 1, 1930—The Censors meet for the examination of candidates, in the Roxbury Masonic Temple, 171 Warren Street, Roxbury, at 4:00 P. M.

Applications must be in the hands of the Secretary at least one week previous to date of examination.

May 6, 1930—The eightieth annual meeting will be held at the Hotel Kenmore, Boston.

Owing to inability to engage the Roxbury Masonic Apartments on the last Tuesday of the month, such meetings as will be held in the Roxbury Temple will be held Monday evenings as per the dates above.

FRANK S. CRUICKSHANK, M.D., Secretary.

Suffolk District Medical Society

May 1—Censors' meeting. Complete notice appears on page 791, issue of April 17.

LELAND S. McKITTRICK, M.D., Secretary.

BOOK REVIEWS

Applied Physiology, by SAMSON WRIGHT, third edition, 1929. Humphrey Milford: Oxford University Press. Price $5.50.

The third edition of Dr. Wright's book appears only a year after the second. Many sections have been considerably revised, and new additions made. The main structure of the book, however, is unchanged. The opening section, the longest in the book, deals with the nervous system and the cerebrospinal fluid. Then follow chapters on the autonomic nervous system, the ductless glands, the blood, the heart and circulation, respiration (including the respiratory function of the blood, tissue oxidation, and muscular exercise), digestion, metabolism and diet, and the secretion of urine. Among the revised and newly added portions of the book are discussions of metabolism of nerve, chronaxie, "occlusion" in reflexes, movement in striatal disease, distribution of sympathetic nerves, active principles of posterior lobe of pituitary, oestrin, alkalemia, "vagus-substance", depressor reflexes, experimental pneumothorax, Cheyne-Stokes, breathing, cytochrome, intestinal obstruction, and utilization of fat. There is also a new appendix, a welcome addition, dealing with Pavlov's work on conditioned reflexes.

To compress this material into five hundred pages is an arduous task. One cannot expect to find in this book the depth of learning and insight displayed by such an author as Bayliss; those who desire a thorough study of the foundations of the subject must look elsewhere. Dr. Wright's intention, of course, is not to produce such a book; his primary aim is to coördinate physiological and clinical knowledge, and this the book effectively achieves.

The book might well be modified in some particulars. On page 3, for example, the formation of the cerebrospinal fluid is discussed, and no decision is given as between the filtration and secretion theories. As far as the reviewer knows, all the known facts can be harmonized with the filtration theory (assuming impermeability for certain ions), and the postulation of secretion is quite unnecessary. The discussion of the shift of chloride and bicarbonates between cells and plasma in relation to oxygen and CO_2 (p. 231) is not quite adequately handled: surely the Donnan equilibrium should be treated in this connection, and also in connection with edema formation (see Henderson's "Blood" and Van Slyke's monograph). On p. 380 it is stated that "the blood flow to the brain is entirely dependent on the general level of blood pressure". This view has been decisively disapproved by the recent work of H. S. Forbes, Cobb and Wolff. Again on p. 382 "the R. Q. of the excess metabolism (in muscular exercise) is found to be unity". The work of Best, Furusawa and Ridout has, however, shown that the R. Q. of the excess metabolism (even of the total metabolism) regularly rises far above 1.0 in very violent exercise; so that it remains uncertain whether active muscle *in the intact organism* draws its energy from carbohydrate. Surely the discussion of biological oxidation (p. 387) should include an account of Warburg's brilliant work.

These, however, are unimportant blemishes. The book should be of great value to students just entering upon their clinical work and to older practitioners of medicine. For those who wish to study clinical medicine in the light of physiological principles it fulfils a function not adequately performed at present by any other book.

Disorders of the Nose, Throat and Ear. Problems of Deafness. By AARON ROTH, M.D., F.A.C.S., Attending Ear, Nose and Throat Surgeon, Jewish Hospital, Brooklyn, N. Y.; Assistant Chief of Staff, Ear, Nose and Throat Department, Brownsville and East New York Hospital, Brooklyn, N. Y. Published by the Physicians and Surgeons Book Company, Brooklyn, N. Y. Price $2.50. 234 Pages.

The content of this little volume should be of interest especially to medical students and laymen. Although it is too abbreviated to serve as a standard textbook, it should be a welcome addition to the medical literature offered as auxiliary reading to nurses in training who may become interested in this branch of medicine.